DEFENSE INDUSTRY BULLETIN

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DEPARTMENT OF DEFENSE

Publication of

ASSISTANT SECRETARY OF DEFENSE-PUBLIC AFFAIRS

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SEP 1966

The Industrial College of the Armed Forces

The Industrial College of the Armed Forces, in addition to preparing senior military officers and Government officials for high policy-making positions in the field of national security, has over the years conducted extension programs to educate military reservists and civilian executives located throughout the nation and the world.

In the article beginning on page 1, Major General William S. Steele, USAF (Ret.) describes the extension educational activities conducted by the college.

Study Under Way To Modernize Naval Shipyards

The Navy has initiated an engineered, long-range study to modernize all Naval shipyards with the exception of New York and Portsmouth. The New York yard was closed on June 30 and Portsmouth will be closed in 1975. A team of associated specialist companies, headed by Kaiser Engineers of Oakland, Calif., has been awarded a contract by the Naval Ship Systems Command to develop the study.

The Long Beach and Philadelphia Naval Shipyards have been named the two pilot yards involved in Phase I of the study, which includes assessment, analysis and recommendations to modernize all equipment and facilities.

Phase II will involve a similar study and recommendations for Charleston, Boston, Norfolk, Pearl Harbor, Puget Sound and San Francisco Bay Naval Shipyards.

Phase I is scheduled for completion in a 24-week period; an estimated 64 weeks will be required to complete the survey and submit the recommendations for all eight yards.

Rear Admiral W. F. Petrovic, Deputy Commander for Shipyards, Naval Ship Systems Command, Washington, D. C., is the Program Director for Shipyard Modernization, with Captain W. N. Ginn Jr., as Deputy Director. Commander W. B. Brantner is Technical Contracts Manager and Mr. H. R. Pyles is Technical Director.

Specialist companies associated with Kaiser Engineers on the project are: H. B. Maynard and Co., Pittsburgh, Pa.; The Raytheon Co., Burlington, Mass.; Gibbs and Cox, Inc., New York, N. Y.; Morris Guralnick Associates, Inc., San Francisco, Calif.; and National Steel and Shipbuilding Co., San Diego, Calif.

USAERDL Surveys Manufacturers of Physical Security Equipment

The management and support functions pertaining to the programming, budgeting and funding for all research, development, test and evaluation (RDT&E) of physical security equipment has been assigned to the Department of the Army by the Defense Department. Within the Army this responsibility has been redelegated to the Commanding Officer, U. S. Army Engineer Research and Development Laboratories (USAERDL), Fort Belvoir, Va.

A vital part of the program is the establishment and maintenance of an information analysis center for the collection, storage, retrieval and dissemination of technical data and/or information on physical security equipment. To accomplish this task, the USAERDL Scientific and Technical Information Division is conducting an extensive survey of intrusion alarm and personnel identification systems in order to obtain all pertinent technical information concerning these systems. Data and/or information received will be indexed and entered into a data bank to be made available to all potential military users of physical security equipment.

Questionnaires were sent to over 200 manufacturers of physical security equipment in June. Manufacturers who did not receive a questionnaire and who wish to participate in this program can request a questionnaire from:

Chief, Scientific and Technical Information Division
USAERDL
Fort Belvoir, Va.

DEFENSE INDUSTRY
BULLETIN

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The purpose of the *Bulletin* is to serve as a means of communication between the Department of Defense (DOD) and its authorized agencies and defense contractors and other business interests. It will serve as a guide to industry concerning official policies, programs and projects, and will seek to stimulate thought by members of the defense-industry team in solving the problems that may arise in fulfilling the requirements of the DOD.

Material in the *Bulletin* is selected to supply pertinent unclassified data of interest to the business community. Suggestions from industry representatives for topics to be covered in future issues should be forwarded to the Business & Labor Division.

The *Bulletin* is distributed without charge each month to representatives of industry and to agencies of the Department of Defense, Army, Navy and Air Force. Requests for copies should be addressed to the Business & Labor Division, OASD(PA), Room 2E813, The Pentagon, Washington, D.C. 20301, telephone, OXford 5-2709.

Contents of the magazine may be reprinted freely without requesting permission. Mention of the source will be appreciated.

Expanding Horizons Through By-Mail Instruction: The New Look of Our Correspondence School

by
Maj. Gen. William S. Steele, USAF, (Ret.)

In this nuclear age, more than ever before, our total resources and all of our economic, social and Governmental institutions have become inextricably tied to our quest for national security. The members of all sectors of our great nation—Government, industry, labor, education, the professions, the military and the public at large—must be well informed and articulate in the complexities of national security affairs if they are to play their necessary parts effectively in safeguarding our way of life.

The Industrial College of the Armed Forces, in addition to preparing senior military officers and Government officials for high policy-making positions in the field of national security, has over the years conducted extension programs to educate military reservists and civilian executives located throughout the nation and the world. In this regard, the Industrial College's Correspondence Course has proven to be most effective. More than 21,000 enrollees have successfully completed this graduate level course. Present enrollment numbers about 5,000.

Numbers alone, however, do not reflect the value of the course. Many participants either now occupy or will soon move up to key positions in national security affairs within the United States and abroad.

Conflicting Demands of Resources Allocation.

These policy makers face formidable challenges in a world that has grown progressively turbulent since the end of World War II. This turbulence encompasses many "fronts"—social, ideological, strategic, geopolitical, economic and actual military conflict. Its influence is all-pervasive. It permeates many of America's internal affairs and almost all of our external affairs. On the domestic side, this turbulence renders the preservation of a strong and viable economic system absolutely mandatory if the United States is to maintain and enhance its position as leader of the Free World.

Relations with Western Europe and the emerging nations of the world are affected. So are tariff and trade questions; foreign economic, military and technical aid; programs of cultural exchange and information dissemination; and our participation in the United Nations and other international efforts looking toward the reduction of world tensions.

In the face of rapid technological progress by potential enemies, the United States has had to give increasing attention to the development of new weapons, to scientific research and to space technology. The pressure of armed conflict in Vietnam has compelled the United States to build up flexible military forces and commit increasing numbers of these forces to the battlefield.

These developments involve policies and action programs which lay heavy claims on America's resources, which are vast but finite. The central challenge is how to reconcile conflicting demands and best allocate available resources in support of immediate and long-range national security programs.

Maj. Gen. William S. Steele, USAF, (Ret.), former Deputy Commandant of the Industrial College of the Armed Forces, is now serving as a consultant and member of the Board of Advisors for the Industrial College. Gen. Steele retired from the Air Force July 31 after 30 years of active service.

The management of logistic resources has become a gigantic business, demanding the increased use of high-speed digital computers and the application of the highest levels of professional knowledge on a rapidly accelerating basis. The broadening of this knowledge among our potential high-level decision makers through advanced education in Defense management has become a primary concern of our top national security planners.

Capstone of Defense Management Education.

It is the purpose of the Industrial College of the Armed Forces to focus on the critical issues and persistent problems in this field. From its inception in 1924, the Industrial College has had a distinctive educational role in resource management. Operating under the direction of the Joint Chiefs of Staff, the college stands today as "the capstone of our military educational system in the management of logistic resources for national security." Its present charter specifically directs the college to "conduct courses of study in the economic and industrial aspects of national security and in the management of resources under all conditions, giving due consideration to the interrelated military, political and social factors affecting national security, and in the context of both national and world affairs in order to enhance the preparation of selected military officers and key civilian personnel for important command, staff and policy-making positions in the national and international security structure."

At Fort Lesley J. McNair, Washington, D.C.—home base of the Industrial College—the Resident Course provides the testing ground for innovations in educational methodology and for new concepts in Defense management.

This 10-month course—the core of the College's three-part program—is now offered each year to 180 carefully selected senior military officers and Government officials. At the close of the 1965-66 academic year, 2,925 officers and civilians, representing all major areas of functional, command and technical responsibility in the Military Services and civilian agencies, had completed this course since 1946, when the name of the college was changed from the Army Industrial College to its present designation as the Industrial College of the Armed Forces.

These resident students share a rare experience. Shedding their various service uniforms and preconceptions, they study together in small-group learning situations and exchange ideas and experiences in an atmosphere of complete academic freedom. The program is fast moving and intensive. Recognized leaders from all sectors of the economy and the Government appear before these students on the auditorium platform and in seminars. Giving generously of their time and talent, these visiting speakers and panelists point up what has succeeded, faltered, or failed in the past and recommend what, in their judgment, is needed for the nation's well-being and defense in the present world setting.

Two extension-type educational activities are conducted for those who cannot attend in residence. The first of these is the National Security Seminar program, in which officers from the military components of the college faculty conduct a series of two-week seminars each year in selected cities throughout the nation. Bringing together selected senior reserve officers and representatives of the local business and the academic and civic community, these seminars have contributed much to supplementing the conferees' backgrounds and their understanding of the crucial issues relating to our national security. As of June 30, 1966, a total of 279 seminars had been completed in 157 cities with a total enrollment of more than 166,000 military and civilian conferees.

Fundamental Improvements in Correspondence Course.

It is my purpose here to focus attention on the far-reaching and fundamental improvements the college is currently making in the third element of its three-part program—the world-wide Correspondence Course, which, until last December, was entitled "The Economics of National Security." In that month a new name —"National Security Management"—was adopted to more clearly reflect the course content and purpose. The current program of intensive curriculum and textbook revision places greater stress on Defense management and on an examination of the policy-making and administrative mechanisms, programs, policies and managerial tools employed in harnessing the Nation's resources for national security.

Established in 1950, the Correspondence Course has evolved as an off-post replica of the Resident Course. Using its own specially-tailored textbooks and tested methods of instruction, the Correspondence School extends the essence of the resident program to active and reserve officers, Federal Government employees, business executives and selected foreign students. The director of the school is Captain Gordon F. Smale, USN, a former member of the Resident School faculty.

Here, indeed, is an extraordinary opportunity for qualified officers and civilians, in and out of Government, to gain a deeper appreciation of the central problems in the management of logistic resources and of the economic and industrial aspects of national security. The Correspondence Course curriculum is presented in 22 small bound volumes, presently organized into five progressive and interrelated units of study.

A "Foundations" unit (Unit I) includes an introductory survey of the entire course, highlights of basic economics, a broad exposition of the main instruments of the Federal Government and of the processes involved in the formulation of our national security objectives and policies, and the basic concepts and practices of modern-day management both in the Government and in the business and industrial world.

Unit II, "The Resources Base for National Security," comprises five texts which analyze the managerial and substantive problems in harnessing our resources—human, material, energy, industrial, transportation, utility, and scientific and technological—for the nation's well-being and security.

Unit III, "Defense Logistics Management," presents, in four volumes and in depth, the central problems of requirements, procurement and production, and supply management

Dr. Harry B. Yoshpe, Chief, Textbook Development Group, The Industrial College of the Armed Forces.

throughout the Defense Establishment.

The theme of Unit IV, "Foreign Aspects of National Security," is presented in five volumes which take the student through the international arena, the intelligence community, U.S. foreign economic policy, mutual security and the ideological struggle for men's minds.

The concluding unit, "Plans and Programs for National Readiness," (Unit V) includes four volumes which highlight the administration of the economy in World War II, the methods, past practices and current planning of emergency economic stabilization measures; the nature and scope of the problems anticipated in the event of a nuclear attack on the home front and the preparedness measures that are being taken to deal with these problems; and, finally, the Communist aims and inroads among the emerging nations and the U.S. response to this challenge through its military and technical assistance and related civic action, community development and public safety programs.

Textbooks—The Life-Blood of Correspondence Study.

Always a basic medium of instruction, textbooks occupy a particularly important place in the college's Correspondence Course. While the Resident Course permits many study techniques—auditorium presentations, seminars, group discussions, simulation exercises and varied reading assignments, the correspondence student is largely confined to his textbooks. The effectiveness of the course depends entirely upon the quality of the texts. The impersonal nature of the instruction and the high caliber of the enrollees demand the best presentation possible of the facts and thinking in the national security management field. It is essential that there be at all times a comprehensive, perceptive and well-balanced set of textbooks, properly keyed to the special needs of correspondence instruction. The central problem is to insure that this important body of educational literature is kept abreast of the rapidly changing national security picture, is in complete harmony with the scope and emphasis of the Resident Course, and is pedagogically sound.

From the inception of the correspondence program, it has been the policy of the college to place primary reliance on "in-house" development of textbooks. A small Textbook Development Group in the Correspondence School serves as the focal point for leadership, guidance and direction to the program; provides direct, concentrated and professional application to the task; and insures the synchronization of the correspondence curriculum with the Resident Course. This group is headed by Dr. Harry B. Yoshpe, Professor of National Security Affairs, a member of the Industrial College faculty since 1961.

In carrying out its responsibilities, the group draws vital support from the Resident School and other components of the college faculty. Outside specialists are brought in for consultations and for reviews of drafts or published texts. Where practicable or necessary, other Government-agency officials and outside scholars contribute directly to the development of texts. Authorization is also obtained to reprint appropriate published materials.

Through these efforts, there has emerged a body of educational literature—popularly referred to as "bluebooks"— that is distinctly the product of the Industrial College. Through these texts the college carries out its policy of basing correspondence instruction on the Resident Course.

The textbook writers take advantage of the unique know-how and resources within the college. A basic program exists for promoting the professional standing of the faculty and better equipping them for their essential contributions to the college program. The college, in turn, gains from the prestige and higher professional attainments of its faculty.

In its approach to the job, the Textbook Development Group maintains exacting standards. It seeks not dry, ponderous, encyclopaedic narrations of detail, but vibrant and interpretative syntheses which are informative and at the same time good reading. The texts must be penetrating, provocative and scholarly, but not pedantic or ornate. They must be accurate, concise and analytical. Along with commitment to objectivity and adequate coverage of all important subject matter, care is taken to insure freedom from excessive redundancy within any particular text and to achieve maximum unity, balance and cohesiveness of the entire series.

Like the civilian faculty in the Resident School, the professional members of the Textbook Development Group hold professorial rank. Their formal resident teaching and other cross-college commitments are deliberately kept light, however, to allow them ample time for their basic research and writing tasks.

The texts are in use in hundreds of libraries throughout the United States and in 51 friendly foreign countries, including foreign war colleges. Of the 22 course volumes, 20 have been translated into five languages: Spanish, Portuguese, French, German and Chinese. One volume is being translated into Japanese. Five nations—Argentina, Brazil, Ecuador, Peru and Venezuela—have incorporated the major portions of the course into their military educational systems.

Tackling Obsolescence.

In its efforts to meet the needs of correspondence instruction, the Textbook Development Group has faced up to the one chronic problem—obsolescence. The Correspondence School curriculum is reviewed and revised each year on the basis of a three-year planning cycle. With the volumes now in the system and under development, the problem of obsolescence should be less formidable than was the case previously. But events and the lead-time in textbook development, revision and publication will inevitably create a lag in the program.

To help offset this problem, the Correspondence School publishes and disseminates to its students an annual *National Security Management Review*. Initiated in the early summer of 1965, this "yearbook" highlights for the student the latest trends, events and problems in major aspects of the course. It brings together a wealth of near-current information in tight space, in sharp focus and in forceful style for ease of understanding and ready use. At the same time, the materials in these annual reviews, tailored and keyed to the texts in the National Security Management series, prove invaluable in updating particular texts as they are taken up in the scheduled revision and development cycle.

Over and beyond the annual reviews and the normal cyclical revision

(Continued on Page 21)

Annual Cost Reduction Report Shows $4.5 Billion Savings in FY 1966

The following is an excerpt from the Fourth Annual Progress Report on the Department of Defense Cost Reduction Program made to the President by Secretary of Defense Robert S. McNamara on July 8, 1966:

Four years ago on July 5, 1962, I reported to President Kennedy on the progress made by the Defense Department since January 1961 in improving operating efficiency and reducing costs, and on our goals for the future. Now, with the completion of the fifth year of operation under this program, I can report to you that notwithstanding the extraordinary demands of our military operations in Southeast Asia:

- Savings of $4.5 billion were realized during FY 1966 through efficiency improvements—$400 million more than estimated.
- Savings of $6.1 billion a year by FY 1969 and each year thereafter have again been set as our long range goal—unchanged from last year. . . .

The savings in FY 1966 were achieved at the same time we were building up a military force of about 350,000 men in Southeast Asia, some 10,000 miles from our shores, and providing the facilities, weapons, ammunition, equipment and supplies required to support them in combat. . . .

All of this has been accomplished:

- Without imposing the usual wartime controls on wages, prices, and civilian production and consumption
- Without calling up the Reserve Forces
- Without imposing wartime tax burdens and while holding Defense expenditures in FY 1966 (as a percent of GNP) at a level lower than that of four of the past five years.

THE COST REDUCTION IN RETROSPECT

With five years of experience behind us and with the "test in combat" provided by the Vietnam conflict, I believe this to be a most appropriate time to assess the contribution of the Cost Reduction Program to the more effective management of the Defense effort.

To obtain an independent, outside assessment of the true savings to the nation produced by the program and to recommend further improvements in its operation, a leading firm of public accountants, Touche, Ross, Bailey and Smart, was engaged. Their principal conclusions are:

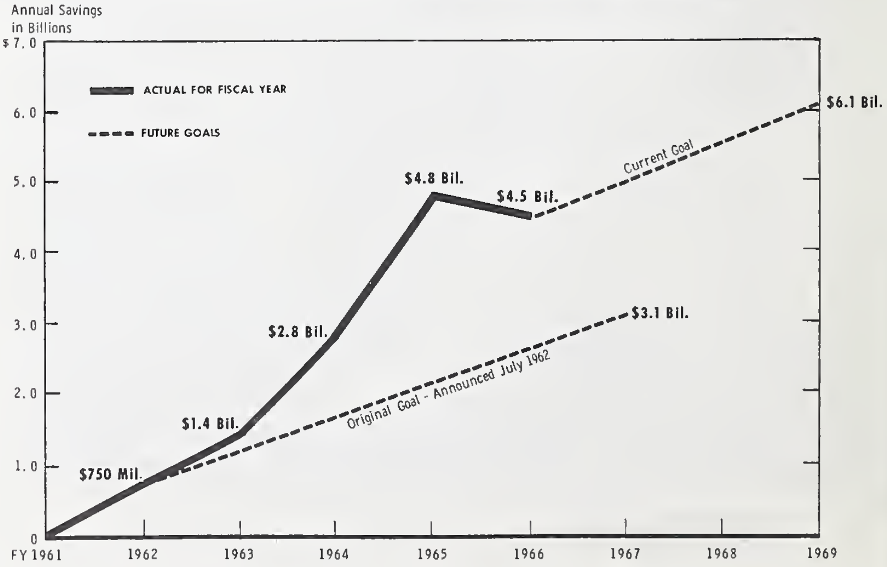
- That the rules established by the Defense Department to asess the savings resulting from cost reduction actions "have been logical and reasonable".
- That the reporting system which applies these rules to the classification, validation and summarization of the cost reduction actions "has produced a reasonable overall monetary expression of savings achieved under the program".
- That the program "has achieved the purpose intended". In short, Touche, Ross, Bailey and Smart believe that the Cost Reduction Program is stimulating economy and efficiency throughout the Defense Establishment. It is a belief I share.

When appraising both the need for and accomplishments of the Cost Reduction Program, we should bear in mind that the primary responsibility of the Defense Department is to be ready for combat. Therefore, it is to be expected that in making day-to-day decisions, we will normally tend to err on the side of surpluses rather than shortages. Thus, without some offsetting incentive for economy, we would always be confronted with a pervasive tendency to overstate requirements, to hoard supplies and manpower, to pyramid "safety stocks" at successive management echelons, to establish standards without regard to cost, and, in general, to stick with the "tried and true" rather than risk innovation. Certainly, we want to be sure that we have everything we need to maintain our combat readiness. But there is absolutely nothing to be gained, and indeed much to be lost, by acquiring more than we need.

The tendency to over-finance and over-order is especially prevalent when our forces are actually engaged in combat. We came out of the Korean War, for example, with about $12 billion of surplus stocks on hand —we hope to avoid a similar waste of national resources during the Vietnamese conflict. . . .

Of course, whenever the level of operations rises, as it does when our forces engage in combat, an increase in Defense expenditures will be required. This in no way invalidates

PROGRESS OF DoD COST REDUCTION PROGRAM



savings previously made under the Cost Reduction Program, which is designed to achieve maximum operating efficiency at any level of operation. Our objective in peacetime is to achieve a sound logistics base which can be expanded quickly in time of war. . . .

My own conclusion is that, even with hindsight, we could not have significantly improved on the overall performance of the Cost Reduction Program during the past five years. Certainly, some mistakes have been made. In a few cases, for example, some savings may well have been reported and accepted which, in retrospect, should not have been. But the monetary value of these is minor indeed (probably not in excess of three or four percent of the cumulative savings of $14 billion). Moreover, for each such instance, there were many other true cost reductions which were either not reported at all or not accepted by the auditors because of a technicality such as insufficient documentation. Certainly, there is room for improvement in the mechanics of the program, as the Touche, Ross, Bailey and Smart report points out.

THE COST REDUCTION PROGRAM IN FY 1966.

The following discussion highlights some of the specific actions taken and the savings achieved during the past year. As you know, the many individual elements of the program are organized around three basic principles:

- Buying only what we need to achieve combat readiness
- Buying at the lowest sound price
- Reducing operating costs through the termination of unnecessary operations, standardization and consolidation.

Buying Only What We Need.

One of our major goals has been to improve the process by which we initially calculate what, when and how much we need to buy. How well we perform this task not only bears heavily on the overall cost of the Defense program but ultimately also helps to determine the military effectiveness of the forces we support. Savings in this area in FY 1966 are estimated at $1.6 billion.

Refining Requirements Calculations. In the case of major weapons and equipment, requirement calculations are refined by a continuing series of program reviews and analyses which seek to establish: sound wearout, attrition and pipeline factors; the proper balance between stocks on hand and post-D-Day production potential; the optimum mix of various types of items in the inventory; etc. . . .

For the literally millions of secondary items, the management of which is necessarily largely decentralized, we have sought to achieve a more precise determination of requirements of automatic data processing equipment and specialized logistics communications systems, and through the continuous revalidation of pipeline, maintenance and safety factors. . . .

Increased Use of Excess Inventories. The greatly increased demand for materiel resulting from combat operations in Vietnam has significantly expanded the opportunities to use excess equipment and supplies and idle production tools owned by the Government. The computerized screening procedures installed in recent years have helped us to take advantage of these opportunities since they quickly identify requirements which can be satisfied by idle assets in lieu of new procurement. . . .

Eliminating Goldplating. When we specify costly quality or performance features not actually required for the achievement of the desired military effectiveness, the waste is truly as real as when excessive quantities are purchased. To stimulate efforts to eliminate "goldplating", our contracts, wherever appropriate, permit the producer to share in any savings that result. Approved contractor proposals rose from about 288 in FY 1964 to 700 in FY 1965 and in FY 1966 are estimated at over 1,000. These actions not only produce substantial savings, but also often contribute directly to the military effectiveness of our weapons and equipment by improving their reliability and ease of maintenance. . . .

Inventory Item Reduction. Every different item carried in our inventory requires separate management, the cost of which is conservatively estimated at $100 per item per year. With the continuing introduction of new weapons and equipment, hundreds of thousands of new items must be added annually. Without a concerted effort to keep new items to a minimum and to purge existing inventories of unneeded, duplicative, or interchangeable items, the total number of different items in the supply system would rise indefinitely. Fortunately, we have been able to reverse this trend which has seen the number of items in our catalog rise from 3.3 million in FY 1958 to about 4 million in FY 1962. Through a vigorous standardization program, the development of an automated Item Entry Control System, the conscious avoidance of parallel development projects by different Services and the continuous screening of the supply inventory, the number of different items in the system has now been reduced to about 3.8 million. In the first nine months of FY 1966, over 334,000 items were eliminated from the catalog.

Buying at the Lowest Sound Price.

One of the outstanding, and I believe lasting, accomplishments of the Cost Reduction Program has been the vast improvement in our procurement operations, as reflected in the increased proportion of contracts awarded on the basis of price competition and in the drastic shift away from cost-plus-fixed-fee to fixed price or incentive type contracts. Savings achieved are estimated at $1.3 billion in FY 1966.

Shifting from Non-Competitive to Competitive Procurement. Of the total of prime contracts awarded through the first ten months of FY 1966, 46.4 percent were awarded on the basis of price competition through the first ten months of FY 1966 compared with 43.4 percent for all of FY 1965.

This is a remarkable accomplishment in view of the fact that many of the urgent Vietnam requirements could, as a practical matter, be met only by adding to the contracts of suppliers already in production. In such cases, even if the original contract was awarded through price competition, the follow-on procurement could not qualify as competitive. Even if the results for May and June slip below the ten month average, I believe FY 1966 will still exceed or at least equal FY 1965. Experience has shown that, on the average, at least 25 cents is saved on each dollar shifted from non-competitive to competitive procurement. This means an estimated $605 million savings in FY 1966. . . .

(Continued on Page 24)

MEETINGS AND SYMPOSIA

SEPTEMBER

U.S. National Committee for **Pure and Applied Biophysics** in connection with the Second International Biophysics Congress, Sept. 5-9, in Vienna, Austria. Sponsor: Office of Naval Research, Contact: Mrs. P. H. Tenniswood, (Code 444), Office of Naval Research, Washington, D.C. 20360. (Area Code 202) OXford 6-1538.

Symposium on **Galio-Marinide**, Sept. 26-27, in Wales and England. Sponsor: Research and Technology Div., AFSC. Contact: R. W. Runnells (AVN), Air Force Avionics Laboratory, Research and Technology Div., AFSC, Wright-Patterson AFB, Ohio 45433. (Area Code 513) 253-7111, ext. 5-3802.

Sixth Annual National Conference on **Environmental Effects on Aircraft and Propulsion** Systems, Sept. 26-28, at Princeton, N. J. Sponsor: Naval Air Turbine Test Station. Contact: Dennis A. Wysocki, Conference Vice Chairman, Naval Air Turbine Test Station, P.O. Box 1716, 1440 Parkway Ave., Trenton, N. J. 08607. (Area Code 609) 882-1414, ext. 355.

Sixth Symposium on **Naval Hydrodynamics, Maneuverability, Waves and Physics of Fluids**, Sept. 29-30, Oct. 3-4, at Washington, D. C. Sponsor: Office of Naval Research. Contact: Mrs. S. W. Doroff, Office of Naval Research (Code 438) Washington, D. C. 20360. (Area Code 202) OXford 6-1433.

OCTOBER

Tenth Annual **Organic Chemistry** Conference, Oct. 4-5, at Natick, Mass. Co-sponsors: Army Natick Laboratories and the NAS-NRC Advisory Board on Military Personnel and Supplies. Contact: Louis Long Jr., Head, Organic Chemistry Laboratory, Army Natick Laboratories, Natick, Mass. (Area Code 617) 653-1000, ext. 414.

Colloquium on the **Photographic Interaction Between Radiation and Matter**, Oct. 26-27, at Washington, D. C. Co-sponsors: Air Force Office of Scientific Research and the Society of Photographic Scientists and Engineers. Contact: Dr. Amos G. Horney (SRC), Air Force Office of Scientific Research, Washington, D. C. 20333. (Area Code 202) OXford 6-8705.

NOVEMBER

Ship Control System Symposia, Nov. 15-17, at Annapolis, Md. Sponsor: USN Marine Engineering Laboratory. Contact: Walter J. Blumberg, Steering Committee Chairman, USN Marine Engineering Laboratory, Annapolis, Md. (Area Code 301) 268-7711, ext. 8670.

Fifth Annual Symposium on **Physics of Failure in Electronics**, Nov. 16-18, at Columbus, Ohio. Co-sponsors: Battelle Memorial Institute and the Rome Air Development Center. Contact: Joseph Schramp (EMERP), Rome Air Development Center, Griffiss AFB, N. Y. 13442.

Third Congress on **Information Systems Science and Technology**, Nov. 21-22, at Buck Hills Falls, Pa. Sponsors: Electronic Systems Div., (AF SC) and MITRE Corp. Contact: Col. C. A. Laustrup (ESRC), Project officer, Electronic Systems Div., AFSC, L. G. Hanscom Field, Bedford, Mass. 01731. (Area Code 617) CR 4-6100, ext. 4527.

Symposium on the **Structure of Surfaces**, date undetermined, at Durham, N. C. Sponsor: Army Research Office-Durham. Contact: Dr. H. M. Davis, Director, Metallurgy and Ceramics Div., Army Research Office-Durham, Box CM, Duke Station, Durham, N. C. 27706. (Area Code 919), 286-2285, ext. 31.

AFA Annual Meeting To Include Industry Briefing Program

Some 39 companies will conduct special briefings on 54 different aerospace and defense subjects at the Air Force Association 1966 Fall Meeting to be held at the Sheraton Park Hotel in Washington, D.C., Sept. 14-16. The briefings will cover advanced aircraft, propulsion technology, space tools, escape systems, communications, guidance systems, composite materials, V/STOL and many other subjects.

This is the third year that the Association has staged this type of program, which combines short and informative company presentations with displays of hardware. Three major features make up the AFA briefing program. First, a summary of each company's proposed presentation is reviewed by a special Military/Government technical advisory committee to determine the quality and educational value of the presentation. Second, the audience is assembled into small parties and escorted to each of the presentations on a specific schedule. Third, those participating in the morning briefings attend an Association luncheon and those participating in the afternoon briefings are invited to attend an Association reception.

Each company session is allocated exactly 20 minutes of which 15 is for the presentation, three for questions and answers, and two for the party to move to its next briefing location.

Invitations are issued to representatives from more than 40 Government departments, agencies, offices and installations. Bus transportation to and from the hotel is arranged to accommodate attendants. Between 2,500 and 3,000 persons have taken part in the program each year.

AUSA Schedules Annual Meeting

The Association of the United States Army (AUSA) will hold its 12th annual meeting Oct. 10-12 at the Sheraton-Park Hotel in Washington, D. C.

Speakers for this year's meeting will include Secretary of the Army Stanley R. Resor; General Harold K. Johnson, U. S. Army Chief of Staff; Lieutenant General Bruce Palmer, Commanding General, XVIII Airborne Corps; Major General Harry W. O. Kinnard, Deputy Assistant Chief of Staff for Force Development; and Colonel Spurgeon Neel, former Surgeon for Military Assistance Command, Vietnam; and others.

Former President Harry S. Truman has been selected to receive the George Catlett Marshall Medal, AUSA's highest award. Presentation will be at the George Catlett Marshall Memorial Dinner on the evening of October 12.

AUSA president, Elvis J. Stahr, former Secretary of the Army, will host a reception for all registrants honoring the Secretary of the Army and the Chief of Staff on the evening of Oct. 10. The Annual Luncheon, honoring the Army's Senior Commanders, will be held on Oct. 11.

More than 90,000 square feet of military and industrial exhibits will be on display at the meeting site. Some 27 Army agencies and commands have been assigned space along with 55 industrial concerns.

ABOUT PEOPLE

DEPARTMENT OF DEFENSE

Kirk H. Logie has been selected as Chief of the newly-established Armed Forces News Bureau in Washington, D.C. The News Bureau operates as a field activity of the Directorate for Armed Forces Information and Education within the Office of Asst. Secretary of Defense (Manpower).

Bernard B. Lynn has been selected to succeed **Edward T. Cook** as Dep. Dir. of the Defense Contract Audit Agency. Cook retires Aug. 5. **James Ruttenberg** will replace Lynn as Deputy for Audit Management.

Dr. Samuel J. Rabinowitz has been designated Acting Deputy Director of the Advanced Research Projects Agency. He replaces **Dr. Robert A. Frosch** who has been nominated for assignment as Asst. Secretary of the Navy (Research & Development).

Dr. Donald M. MacArthur has been appointed as Dep. Dir. (Chemistry and Materials), a recently created position in the Office of the Director, Defense Research & Engineering.

Maj. Gen. John A. Goshorn, USA, has been named Dep. Dir. for Contract Administration Services, Defense Supply Agency. He succeeds **Maj. Gen. William W. Veal, USAF,** who has been reassigned to Wright-Patterson AFB, Ohio.

RAdm. William E. Lamos, USN, has been designated Dir., Far East Region, Office of Asst. Secretary of Defense (International Security Affairs). The assignment became effective July 16.

RAdm. William N. Leonard, USN, has been assigned as Asst. Dir. (Operational Test and Evaluation), Office of the Dep. Dir. (Administration and Management), Office of the Dir., Defense Research & Engineering.

Col. Grover Heiman Jr., USAF, has been named Chief, Magazine and Book Branch, Office of Asst. Secretary of Defense (Public Affairs). He replaces **Col. C. V. Glines, USAF,** who has been assigned as Chief, Public Affairs, Alaskan Command.

Capt. Joseph S. Burkle, MC, USN, has been appointed Dir. of the Armed Forces Radiobiology Research Institute in Bethesda, Md.

Col. James T. Brennan, MC, USA, Dir. of the Armed Forces Radiobiology Research Institute for the last five years, retired from military service June 30.

Col. Gerald Johnson Jr., USA, has been named Dir. of the Defense Contract Administration Services Region, Philadelphia, replacing **Col. William S. Collinson, USAF,** who is retiring.

DEPARTMENT OF THE ARMY

General Harold K. Johnson, U.S. Army Chief of Staff, was awarded the Distinguished Service Medal, the Army's highest non-combat award, during ceremonies at the Pentagon July 13. Gen. Johnson was cited for meritorious service in a position of great responsibility as Army Chief of Staff from July 1964 to July 1966.

The Chief of U.S. Army Engineers has announced the establishment of a new position of Chief Topographer in his office and the appointment of **Archer Wilson** to that position.

Maj. Gen. Charles Billingslea, Dep. Commanding General of the U.S. Army Combat Developments Command, Fort Belvoir, Va., has retired from service.

Col. Eugene J. McGinnis has been named the new Dir. of the Army Missile Command's Procurement and Production Directorate at Redstone Arsenal, Ala.

Col. Reuben Mundy, Dir. of the Army Missile Command's Missile Intelligence Directorate, has retired. He has been replaced by **Col. Thomas A. Rodgers.**

Col. Ben Harvey Jr., has assumed duties as Dir., Evaluation Directorate, U.S. Army Combat Development Command, Fort Belvoir, Va., relieving **Col. William H. Vail Jr.**

DEPARTMENT OF THE NAVY

RAdm. Ben. W. Sarver assumed the office of Vice Commander, Naval Ordnance Systems Command on July 1. He comes to the assignment from duty as Dir. of the Surface Missile Systems Project, Office of Naval Material.

RAdm. Jackson D. Arnold is slated to relieve **RAdm. Frank C. Jones** as Dep. Chief of Naval Material (Logistics Support) in September. Adm. Jones will be reassigned to the Ship Systems Command.

Maj. Gen. Keith B. McCutcheon, USMC, has been assigned as Dep. Chief of Staff (Air) at Marine Corps Headquarters.

Capt. Frederic W. Corle, who has been selected for promotion to the rank of rear admiral, has been relieved as Commanding Officer, Navy Electronics Supply Office, Great Lakes, Ill. by **Capt. W. F. Harvey Jr.** Capt. Corle has been reassigned as Commanding Officer, Naval Ships Parts Control Center, Mechanicsburg, Pa.

Capt. John W. Wade has been assigned duties as Dep. Commander, Naval Supply Systems Command (Transportation).

Capt. C. W. Pittman Jr. has relieved **Capt. F. M. Blanchard** as Commanding Officer, Naval Air Technical Services Facility, Philadelphia.

The Naval Facilities Engineering Command (NFEC) announces the following command assignments:

Capt. Henry J. Johnson relieved **Capt. William E. Davidson** as Dep. Dir., NFEC, Pacific Div. **Capt. John D. Burky** became Commanding Officer of the Naval Construction Battalion Center, Davisville, R.I., replacing **Capt. Joseph H. Barker Jr.,** who retired.

Capt. Davidson took command of Capt. Burky's former post as Commanding Officer, Western Div., NFEC. **Capt. Ralph B. Grahl** assumed command of the Public Works Center, Guam, relieving **Capt. Harry Stevens Jr.,** who took Capt. Johnson's former post as Commanding Officer of NFEC Eastern Div. **Capt. Bernard O. Roessler** reports as Commanding Officer of the Public Works Center, Newport, R.I. He replaces Capt. Richard T. Pratt who has retired.

Capt. Albert R. Marschall will relieve **Capt. Nelson R. Anderson** as Commander of the 30th Naval Construction Regiment. **Capt. Bryan S. Pickett** will relieve **Capt. Joseph W. Frorath** as Commanding Officer, Northwest Div. NFEC. Capt. Frorath will relieve **Capt. John A. Stelger** as Dep. Commander, Atlantic Div. NFEC. Capt. Stelger will retire.

DEPARTMENT OF THE AIR FORCE

Maj. Gen. Ben I. Funk, Commander of Space Systems Division, Air Force Systems Command, will retire Sept. 1. He will be replaced by **Brig. Gen. Paul T. Cooper.**

Maj. Gen. William W. Veal returned to duty with the Air Force Logistics Command Aug. 1, replacing **Brig. Gen. William G. Lee Jr.,** as Dir. of Plans and Programs at AFLC headquarters. Gen. Lee has retired.

Maj. Gen. C. B. Root, Mobile Air Material Area Commander, will retire from active military service in October. He has served at Mobile since Feb. 1, 1965.

Maj. Gen. Richard S. Abbey has been assigned as Asst. Chief of Staff for Reserve Forces at USAF headquarters.

Brig. Gen. Robert C. Richardson III, Dep. Chief of Staff (Science & Technology), AFSC headquarters, is scheduled to become Dep. Commander, Defense Atomic Support Agency Field Command, Sandia Base, N.M.

Brig. Gen. William R. Yancey, Vice Commander, Aeronautical Systems Div., (AFSC), is scheduled for retirement on Sept. 1.

Col. Louis O. Adler has been reassigned to the Air Force Systems Command as Dep. for Special Contracts in the Office of the Dep. Chief of Staff (Procurement Production).

Col. Edward H. Robertson has been assigned as Chief, Procurement Office, Space Systems Div. (AFSC), Los Angeles.

REMOTE COMPUTING

Electronic Data Processing Progress in the Innerspace/Aerospace Navy

by

Cdr. Eugene Gralla, SC, USN

Early in 1964 the Management Information Division, Office of Naval Material, conceived an idea which later was approved and elevated to quasi-project status by the Deputy Chief of Naval Material, Rear Admiral R. L. Shifley. He directed Management Information Division to "connect remote communications units to a Navy-owned, large-scale computer for a rapid reply system to solve day-to-day engineering problems."

This "go" sign fired a previously designated study group to such a degree that today turn-around time in the solution of engineering problems has been slashed downward from approximately four days to four hours or less. Within the next several months, it is envisioned that the "Remote Computing/Time Sharing" methodology currently being pursued by the Navy will provide the media to solve engineering/scientific problems almost immediately.

This current ADP endeavor becomes another first in pioneering efforts in electronic data processing in the Navy—an effort that had its beginning in the mid-fifties at research facilities in eastern universities followed by actual operation of a prototype computer at the Aviation Supply Office in Philadelphia.

At the completion, then, of a period of about 15 years experience, remote computing becomes the ultimate in ADP advancement to bring Navy's vast inventory of computational ability closer to the personnel requiring its services. In this manner, the Navy's computers become available simultaneously to serve many users in solving many different problems.

In Retrospect.

Initially, the Remote Computing Study Group, sponsored by the Chief of Naval Material (CNM), decided that only one of three laboratories in the Washington, D.C., area involved in the project would be used to explore the vast potential of remote problem solving and to evaluate the testing. However, each of the three laboratories providing membership on the study group—namely, Naval Ordnance Laboratory, White Oak, Md.; the Naval Weapons Laboratory, Dahlgren, Va., and the David Taylor Model Basin, Carderock, Md.—volunteered.

It was then decided that each laboratory would jointly participate by developing its own capability and, after full operation, advance the project goals from there. In subsequent weeks the study group launched into a nine-point program to:

- Designate "prototype" laboratories.
- Train engineers in the use of simplified programming.
- Develop standard programs for repetitive problem calculations.
- Install remote devices "off-line" to the activity's computer to provide easier access for engineers.
- Solve small engineering routines faster and at lower cost.
- Utilize available computer time to the fullest.
- Extend the project to other laboratories in the general area.
- Modify or replace the present computers to permit remote devices "on-line."
- Expand the concept Navy-wide.

Cdr. Eugene Gralla, SC, USN, is Head of the Information Systems Design and Control Branch of the Management Information Division for the Chief of Naval Material.

Examples of Today's Progress.

A few noteworthy examples of the Navy's current advancement and use of the Remote Computing ADP Technique are:

- Naval Weapons Laboratory, Dahlgren. The Naval Weapons Laboratory (NWL), Dahlgren, Va., has the mission task and Navy responsibility to "conduct theoretical and experimental studies of computing machines and machine components, and of more advanced and effective means of computation as well as analyses, evaluations and design of data processing systems." Consequently, NWL Dahlgren was vitally concerned and initiated a research approach in remote computing. This undertaking was to enable NWL Dahlgren to evaluate direct-access computing concepts experimentally by utilizing both existing systems and a NWL research system.

Preliminary work with existing systems has been useful. Today, however, at NWL Dahlgren most efforts are being concentrated on the NWL pilot system, which, when operational, can be used Navy-wide.

To accelerate its pace and step up its ADP research, NWL Dahlgren has installed one of the first modular "third generation computers." This newly advanced equipment has recently been augmented with user terminals to include cathode ray tube displays, light pens, alphanumeric keyboards and function keyboards.

Plans for this facility include the use of general purpose languages such as FORTRAN, console communication languages, display-oriented languages such as those for analog simulation and symbol manipulation.

Within the next few months, a system which will run under an elementary monitor, and which will timeshare the two consoles with a background problem is expected to be operational. There will initially be two user languages. One, called AAP (Analyst Assistance Program), is a partial subset of FORTRAN and is intended mainly as a computational aid for exploratory analysis; the other is an analog simulation language. AAP will permit the user to compose, modify, or use parts of a program via the light pen. The values of the variables and the function and codes available are visually presented on the cathode ray tube (CRT) display.

- **Development of Graphic Programs at NWL Dahlgren.** Work is currently under way on the development of a collection of graphic programs to be used either separately or incorporated in a display-oriented conversational FORTRAN system which is presently under development. Work on symbol manipulation (a procedure for the use of formal mathematics in the solution of differential equations or the algebra of series) is presently being continued as a separate phase; the specifications for its implementation have not yet been fully determined.

The overall project objective is to improve the usefulness of the computer as a tool for mathematicians, scientists and engineers. This can be done by providing them with direct access to a large, time-shared computer system, thereby improving the response time and permitting the user to make on-line decisions that otherwise would have to be pre-programmed, sometimes at considerable expense and sometimes not possible. Results of this pilot study of terminals, languages, graphic displays, etc., are expected to be an invaluable aid in the development of very large operational time-shared systems for use at Dahlgren and other similar laboratories.

- **Navy Automated Research and Development Information System (NARDIS).** NARDIS is an information system under the direction of the Chief of Naval Research and supported by the Office of Naval Research, Bureau of Ships and the Bureau of Naval Weapons. The system's basic objective is to establish and maintain a common data bank of scientific, technical and administrative information on all Navy-sponsored research and development. This data bank may be used as a prime source of RDT&E information by all military, management, scientific and technical echelons of the Navy.

Future developments for NARDIS will be oriented toward a real-time system with remote control features. Plans for these developments are evolving and will come to fruition once the present computer system has been well established and evaluated. It is anticipated that plans for future development of NARDIS will incorporate and emphasize random access devices such as disc files, drums, etc. In addition, plans will include remote control features which will permit the user to communicate with and query the NARDIS data bank from his location.

- **U.S. Naval Academy, Annapolis.** Within weeks the midshipmen may find their problem solving made easier. Remote terminal equipment tied into a computer center will enable the faculty and student body to use the most effective methods and the great potential afforded by ADPE.

Of current and particular interest at the academy is the contribution that the remote computing methodology might make to the 3,500 midshipmen in the modern and rapid solution of assigned mathematical problems.

Remote Computing Timetable.

The original phasing of the timetable to achieve the objectives of the potential of remote computing within the Naval Material Support Establishment was as follows:

- Phase I. Off-line stacking of small scientific/engineering jobs (usually programmed by the personnel requesting the services) for batch processing several times per day, through a large size computer, to permit four-hour or less turn-around time to the user.

- Phase II. Use of a small size computer to test the economic feasibility of several types of remote terminals which concurrently process small scientific/engineering applications including programming preparation.

- Phase III. Use of a medium size computer to process small scientific/engineering applications from remote terminals concurrently while simultaneously processing a direct user small background program.

- Phase IV. Use of a large size computer or multiple Central Processing Unit (CPU) system to productively process a large scientific background program simultaneously with several small scientific/engineering programs entered from numerous and various types of input/output remote terminals located inhouse and at other Navy activities. This would be the start of the Scientific/Engineering ADPS Service Center.

- Phase V. Use of a large size computer or multiple CPU system to process productively a large business background program simultaneously

(*Continued on Page 13*)

Data Processing Center, Naval Weapons Laboratory, Dahlgren, Va.

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OCTOBER 1966

SPEAKERS CALENDAR

DEPARTMENT OF THE ARMY

Gen. Frank S. Besson Jr., Commanding General, Army Materiel Command, at 21st Annual Transportation and Logistics Forum, National Defense Transportation Association, Dallas, Tex., Sept. 20.

DEPARTMENT OF THE NAVY

RAdm. R. L. Shifley, Vice Chief of Naval Material, at Armed Forces Staff College, Norfolk, Va., Sept. 8.

RAdm. A. R. Gralla, Commander Naval Ordnance Systems Command, at Underwater Warfare Seminar, Newport, R.I., Sept. 12.

RAdm. Pierre Charbonnet, Commandant, 8th Naval District, at Hot Springs Navy League Council, Hot Springs, Ark., Sept. 13.

RAdm. Jack S. Dorsey, Commandant, 6th Naval District, at South Carolina Buttonhole Club, Greenville, S.C., Sept. 13.

RAdm. J. P. Sager, Asst. for Material Acquisition, Naval Air Systems Command, at Logistics Management Symposium, Huntsville, Ala., Sept. 13.

RAdm. E. F. Metzger, Commanding Officer, Navy Supply Center, Oakland, Calif., at National Defense Transportation Assn. Meeting, Dallas, Tex., Sept. 19.

RAdm. Henry H. Caldwell, Commander, Fleet Air Jacksonville, at Douglas Management Club Meeting, Sacramento, Calif., Sept. 21.

VAdm. I. J. Galantin, Chief of Naval Material, at Navy-Industry Material Reliability Conference, Shoreham Hotel, Washington, D.C., Oct. 26; at American Society of Naval Architects and Marine Engineers, Hilton Hotel, New York City, Nov. 11.

DEPARTMENT OF THE AIR FORCE

Hon. L. Marks Jr., Asst. Secretary of the Air Force, (Financial Management), at CPA Society Meeting, Los Angeles, Calif., Sept. 12.

Hon. Harold Brown, Secretary of the Air Force, at AFA Anniversary Banquet, Washington, D.C., Sept. 16.

Gen. J. P. McConnell, Chief of Staff, U.S. Air Force, at AFA Anniversary Banquet, Washington, D.C., Sept. 16; at Defense Orientation Conference Assn. Meeting, Washington, D.C., Sept. 30; at American Ordnance Assn. Meeting, Los Angeles, Calif., Oct. 5-6; at International Congress on Air Technology, Hot Springs, Ark., Oct. 28.

Gen. G. P. Disosway, Commander, Tactical Air Command, at Chamber of Commerce, Oklahoma City, Okla., Sept. 16.

Maj. Gen. H. E. Humfeld, Commander, 1st Strategic Aerospace Div., Strategic Air Command, at National Security Industrial Assn. Meeting, Vandenberg AFB, Calif., Sept. 23.

Maj. Gen. G. F. Keeling, Deputy Chief of Staff, Procurement and Production, Air Force Systems Command, at National Security Industrial Assn. Meeting, L. G. Hanscom Field, Mass., Sept. 23.

Maj. Gen. H. B. Manson, Commander Air Force Flight Test Center, Edwards AFB, Calif., at Trade Club Meeting, Bakersfield, Calif., Oct. 19.

CALENDAR OF EVENTS

Aug. 23–24: Procurement Conference in conjunction with the Sixth Annual Maine Products Show, Portland, Maine. Contact: Clarence F. McKay, Maine Department of Economic Development, State Office Building, Augusta, Maine.

Sept. 2–3: Canadian International Air Show, Toronto, Ontario, Canada.

Sept. 5–11: National Championship Air Race, Reno, Nev.

Sept. 8–9: Business Opportunities Conference, Milwaukee, Wis. Contact: Lee Berndt, Executive Secretary, Metropolitan Jaycees, 2000 13th Ave., Milwaukee, Wis.

Sept. 11–16: American Chemical Society Meeting, New York City.

Sept. 13–15: National Security Industrial Assn.-U.S. Air Force Electronics Conference (Secret), Murray Hall, U.S. Naval Station, Boston, Mass.

Sept. 14: Procurement Conference, Rochester, N.Y. Contact: Rochester Chamber of Commerce, 55 St. Paul St., Rochester, N.Y.

Sept. 14–16: Air Force Assn. Aerospace Development Briefings/Displays, Sheraton Park Hotel, Washington, D.C.

Sept. 17–18: Midwestern Aviation & Space Exposition, Willow Run Airport, Detroit, Mich.

Sept. 18–21: National Defense Transportation Assn. Meeting, Dallas, Tex.

Sept. 18–21: American Institute of Chemical Engineers Meeting, Atlantic City, N.J.

Sept. 18–22: American Society for Industrial Security Meeting, Philadelphia, Pa.

Sept. 19–20: Government-Industry Procurement Conference, Portland, Ore. Contact: S. H. Mallicoat, Dept. of Commerce, State of Oregon, Div. of Planning & Development, Portland, Ore.

Sept. 21: International Atomic Energy Agency Meeting, Vienna, Austria.

Sept. 22–23: Government-Industry Procurement Clinic, Seattle, Wash. Contact: Tom Hynes Jr., Dept. of Commerce & Economic Development, 312 First Ave., N., Seattle, Wash.

Sept. 24–Oct. 2: Greater Jackson Chamber of Commerce Midwest Space Fair, Jackson, Mich.

Sept. 27–30: American Roentgen Ray Society Meeting, San Francisco, Calif.

Sept. 28–29: National Security Industrial Assn. Marine Geodesy Symposium, Columbus, Ohio.

Oct. 3–5: International Electronics Conference and Exhibition, McCormick Place, Chicago, Ill.

Oct. 3–5: Institute of Electrical and Electronics Engineers Aerospace and Electronics Convention, Sheraton-Park Hotel, Washington, D.C.

Oct. 4–6: American Oil Chemists Society Meeting, Philadelphia, Pa.

Oct. 5–7: International Assn. of Electrical League Meeting, Scottsdale, Ariz.

Oct. 6: National Security Industrial Assn. Annual Meeting and Dinner, Washington, D.C.

Oct. 7: Society of American Military Engineers Meeting, St. Paul, Minn.

Oct. 9–14: Electrochemical Society Meeting, Philadelphia, Pa.

Oct. 10–12: Assn. of the U.S. Army Meeting, Sheraton-Park Hotel, Washington, D.C.

Oct. 11–13: Armed Forces Management Assn. National Conference, Shoreham Hotel, Washington, D.C.

Oct. 27–28: Tulsa Chamber of Commerce Air Festival, Riverside Airport, Tulsa, Okla.

Oct. 31–Nov. 2: Defense Supply Assn. National Convention, Benjamin Franklin Hotel, Philadelphia, Pa.

Nov. 8–10: Joint Computer Conference, San Francisco, Calif.

Total Package Procurement Concept

by

Col. Robert E. Lee, USAF
Director of Procurement Policy, Headquarters USAF

The purpose of this article is to discuss problems encountered in the C–5A competition, the lessons learned, and changes to be effected by the Air Force in future total package buys. We have had Air Force teams working since the C–5A award on just that subject and we have many changes under consideration. Later in the article, I will discuss some of the more significant lessons learned.

First, I want to clarify just what we are discussing. The Total Package Procurement Concept is an extension of long-standing procurement policy. It can be defined as follows:

> **The procurement of, after a single competition, engineering development and production of systems, and as much support as is feasible such as aerospace ground equipment, spares, training devices and training support, and contractor technical support.**

The key words in this definition are "a single competition." There is nothing new about Total Package Concept (TPC)—the newness is the degree to which it was applied.

Traditionally, we have always had some degree of competition, technical or price, or both, for our major weapon system programs. But for the follow-on production, we have frequently found ourselves in a sole source position, "locked in" with the research and development contractor. When we made our decision to buy the program, much of that decision was based on promises made by the contractor for the performance and cost of the system in production and solely on the R&D effort. Our experience has taught us that these promises tend to be optimistic when a program is being "sold." The total package concept makes these promises contractually binding.

The Air Force Experience.

To date the Total Package Procurement Concept (TPPC) has been applied up to contract award on only one system—the C–5A aircraft.

Other programs have been identified for total package procurement in all of the Services and are in various preliminary stages. Although the C–5A is the first total package procurement, the total package concept is not the only first of this program. The C–5A is the first system to undergo a comprehensive contract definition pursuant to DOD Directive 3200.9 and the first system in which the complete Air Force Systems Command 375 series of program management documents have been applied from the outset.

A Request for Proposal (RFP) containing, among other things, a Work Statement and Model Contract for Contract Definition, and a Work Statement and Model Contract for development and acquisition of the C–5A aircraft, was distributed on Dec. 11, 1964, to the three airframe and two engine contractors who had participated in the parametric studies leading up to the approval of the C–5A program. On Dec. 31, 1964, the Air Force entered into a contract definition contract with each of these five contractors. The work statement called for the identification and preparation of performance specifications to be used in the operational system, as well as price proposals for development, production and support of such hardware.

Support would include all required aeronautical ground equipment, training equipment and contractor technical services, together with spares and maintenance through the Category II Test Period. Spares beyond Category II would be added to the contract by provisioning action and would be priced in accordance with a detailed pricing exhibit in the contract. Award of a contract would be made to the source whose cost and technical proposals as evaluated by the Air Force demonstrated the greatest overall cost effectiveness over a ten-year operating period of the system, complying with all of the minimum performance requirements established in the RFP. To this end the contractor was required to prepare a ten-year operating cost estimate on certain given assumptions. This was to be added to the research, development, test and evaluation (RDT&E) and production costs and compared with the productivity of the proposed system over the same period. Although the initial production airframe buy was only 57 aircraft, a priced option was requested on 58 more. Costs and other factors for source selection purposes was to be computed on a buy of 115 Total Operational Systems.

The technical proposals were submitted on April 20, 1965, and the cost proposals on April 27, 1965.

From a procurement point of view, our major problems were to devise and negotiate a definitive contract that would fix responsibility for the aforementioned premises. How did we do it?

In the contract, in addition to all the normal provisions, there are specific clauses imposing responsibility for the total C–5A on the airframe contractor. The really significant provisions are designed to hold the winner to the commitments on which selection was based. In the air vehicle contract, and most significant of these special provisions, are:

- **Pricing.** The contract has firm target prices for 115 aircraft and the development necessary to produce them. In addition, all aerospace ground equipment (AGE), training and training equipment, contractor support, and spares through Category II testing are firm priced. The incentive cost sharing arrangement has a firm 50/50 sharing below target cost and a 70/30 sharing above target cost to a ceiling price that is 130 percent of target cost.
- **Performance.** The performance commitments established in competition are backed up by a correction of deficiencies clause under which the contractor must, if so directed by the Air Force, correct any deficiency at no change in target or ceiling price. The performance requirements stated in the contract are those proposed by the contractor which must equal or exceed the RFP requirements.
- **Performance Incentive.** Since the correction of deficiencies provisions cover any case of performance less than that promised, there is no negative incentive. There is a reward incentive based on achievement against

a productivity index set forth in the contract. The productivity index is based on payload, range and cruise speed. A 15 percent improvement against the productivity index target will provide a maximum reward of $22.5 million.

- **Specification Changes.** On individual changes up to $100,000, there will be no adjustment in the target cost. On changes over $100,000 there will be a target price and ceiling price adjustment, including a profit not to exceed 10 percent until all such changes aggregate three percent of the initial total target cost. Thereafter the profit increment cannot exceed two percent. The intent of these provisions is to discourage the contractor from proposing unnecessary changes. However, on individual changes exceeding one percent of the initial target cost, this two percent profit limitation will not apply, because such a change would represent a significant departure from the initial work statement.

- **Delivery Incentive.** The contract provides a penalty of $12,000 per day late for each of the first 16 aircraft delivered up to a maximum penalty of $11 million. This is a liquidated damages clause.

- **Schedule Change.** There is a formula for changing the end-item prices if the delivery schedule is compressed or stretched out. This is an example of clauses designed to preclude any negotiation in a sole source environment.

- **Catastrophy Clauses.** There are three provisions in the contract to protect the Air Force and the contractor against unwarranted risks. One is to provide for adjustments for price as a result of changes in Federal law. Another is to provide for price adjustments in the event of unanticipated catastrophic changes in the economy. A third is to provide some relief in the event that unanticipated developments cause a wide variance between the target cost and actual cost.

- **Total Systems Responsibility.** We are concerned not with the performance of the airframe or engines in isolation, but with the total aircraft systems. Therefore, the airframe contractor's responsibility will include the performance of the aircraft as an integrated system, including engines. Since the engines are Government furnished, it was necessary for the airframe manufacturer to negotiate an agreement with the engine manufacturer under which the responsibilities of the manufacturers to each other are specified. Thus, the Air Force, although buying the engines direct and furnishing them to the airframe contractor, can look to the airframe contractor if the airframe/engine combination does not meet its performance "in the air."

Each of the five contractors' proposals was submitted in 30 copies and the total mass of data received weighed 35 tons. Over 400 people spent two and one-half months for a total of 132,000 manhours in reading and evaluating these proposals. Definitive Fixed Price Incentive (FPI) contracts for RDT&E, delivery of 57 total systems, and support as outlined above were negotiated and signed by each of the contractors prior to the source selection announcement on Sept. 30, 1965, a total of 10 months from Contract Definition Phase (CDP) to a definitive production contract on a major Air Force system.

That's enough on what we bought and how we bought it. Let's look briefly at some of the significant lessons learned.

First, it appears that we should adopt the TPC earlier in the cycle than we did on the C–5. The short time that was allotted to get out an RFP caused many problems and changes, which contributed to the massive data we received. Procurement planning must be formalized in the conceptual state of the CDP.

The multiplicity of new concept in one program compounded our problems and also added to the excessive data submissions. In regard to the use of the 375–5 systems engineering management procedures (the C–5 was not the best test case), we found that this procedure is conceptually compatable with TPC but would be of greater value when used on less defined systems. Application in the case of the C–5 appeared to be too detailed and we found there was some redundance with other areas.

Basically our RFP concepts were good. Due to the short time for procurement planning, it now appears that we should have limited alternative proposals and made earlier decisions. This would have reduced the volume and detail of data submissions. We believe that the detailed submissions in the areas of AGE and spares were not practicable and we are considering changing this approach. We ended up with a formula methodology for pricing some spare parts and a price list for pricing those acquired after the completion of Category II testing.

Also, we now believe that we can reduce much of the management and procurement information that was required, through the establishment of a data matrix to select what data is necessary for each phase. We achieved outstanding success in the use of the model contract technique and as a result of our C–5 experience will probably use this technique on all competitive CDP's. This technique, requiring the preparation of model contracts during CDP, is set up for the purpose of getting all of the boiler plate, special provisions, and other knotty problems including legal coordination resolved prior to actual contractor selection.

Some people are firmly convinced that the most important achievement of TPC was obtaining a completely definitized document under a competitive umbrella. This could not have been done had we not fully exploited the model contract during CDP. We are firmly convinced that the increase in data requirements that will ultimately result from CDP and the TPC will be well worth this particular end result.

We did run into some problems in our cost effectiveness approach, primarily because we didn't establish our cost effectiveness criteria early enough. We are concentrating much effort in this area, particularly as it relates to 10-year maintenance and reliability cost effectiveness.

One of the general principles of the TPC is a maximum disengagement of contractor controls by the Air Force. The objective is to establish a long term program under competition, then to disengage to the maximum practical degree. If the C–5 competition is any indication, there is unanimous agreement on this philosophy.

We still have much work to do on the interface between program visibility and contractor control. Certainly in the area of technical direction, the TPC, plus correction of

(Continued on Page 20)

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Publications that require remittance are available for purchase from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.

Remote Computing

(*Continued from Page 9*)

with several small and medium business/logistics programs. The latter would be entered both from slow speed terminals and from high speed terminals sometimes located at remote ADP sites. This would be the start of the Business/Logistics ADPS Service Center.

It was originally felt that it would take a period of five years to accomplish the five phases of the project. However, with the interest and activity demonstrated to date, the ADPS Service Centers should be operational in three years or less.

Remote computing will eventually close the gap that now exists between the use of a slide rule and the extremely complex task of preparing and programming a computer run, delivering it to the data processing center and waiting perhaps hours for a solution. The remote computing concept is almost like having a computer of your own—as far away as your finger tips—continuously "at your service" regardless of your physical location. You can be within reach or you could be at a distance of some hundreds of miles.

Whatever your position might be in today's progressive data processing environment, remote computing is the ascending technique—the status symbol for the individual or activity getting ahead.

The Air Force Eastern Test Range: Government-Private Industry Teamwork in Practice

by

Maj. Gen. Vincent G. Huston, USAF
Commander, Air Force Eastern Test Range
Air Force Systems Command

The Air Force Eastern Test Range (AFETR) is—in terms of work force, geography, investment and activity—the largest of six Defense Department National Range sites. The other five are the Air Force's Western Test Range and Satellite Control Facility; the Army's White Sands Missile Range and Kwajalein Test Site; and the Navy's Pacific Missile Range. Through its Cape Kennedy operations, AFETR has become a world-renowned news dateline, the spawning ground for most of the nation's missile and space progress, and the logical threshold for many of tomorrow's more ambitious objectives.

In the fantastic growth and events of AFETR's 15-year history, one other vital aspect of Cape Kennedy operations has been overshadowed. This is the experience-tempered teamwork that has developed between Government and private industry. The efforts of Federal and commercial organizations located through the United States meet at Cape Kennedy. From this focal point these efforts are diffused into practical uses ranging from space exploration to combat readiness with military units in the field.

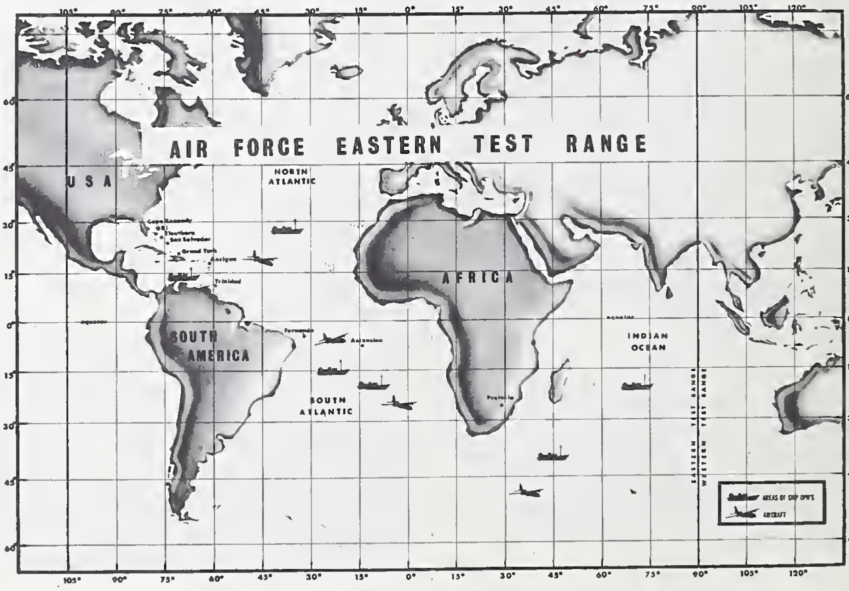
Some 30 military and other Federal agencies are permanently represented at AFETR, which is a component of the Air Force Systems Command's National Range Division. These and the more than three score organizations of the aerospace industrial community total a work force now in excess of 27,000 people. This total does not include short-term contractors engaged in construction or equipment installation. Nor does it include persons assigned to the National Aeronautics and Space Administration (NASA) facilities on neighboring Merritt Island. This complex combination of organizations, working individually and collectively, is the outstanding reason for the singular accomplishments of AFETR.

The Eastern Test Range work force consists of 18,900 military, Federal civilians and contractor people. At the center of this functional structure, called simply "the Range," are 4,200 military and Government civilians organically assigned to the AFETR. In addition, there are 14,700 other military and civilian Government personnel and contractor employees engaged in services needed to operate and maintain the range. A major segment of this latter group, which is under the operational control of the range commander, is employed by Pan American World Airways and the Radio Corporation of America.

On the other side of the equation at the Eastern Test Range are 8,400 people assigned to Government organizations and contractors employed in development and testing of missiles, spacecraft and associated subsystems. This segment of activity at ETR is called "Range Users" and is engaged in assembly, checkout, launch, or other phases of vehicle experimentation and evaluation. In addition, the Eastern Test Range serves as host to over 50,000 official visitors and transients each year.

The range is a high-precision, high-capacity flight test facility for all larger classes of missile and spacecraft research and development. The primary product of the range is diagnostic data. These data are measured by every available means and recorded in large quantities in real-time to a nine-digit accuracy. Many other services are required as a corollary to these data products. They include the assurance of range and flight safety, communications, launch services, the manufacture of liquid oxygen, and ocean search and recovery. These services are in direct support of stated range-user needs. The range must also perform self-support services ranging from the sophisticated (optical calibration, for example) to the commonplace (base logistic support).

The establishment of AFETR facilities and services conforms to the fundamental pattern set out in 1949 by the Congress in creating the range.



Specifically, it was the intent of Congress that those test facilities or services needed by two or more agencies, or their contractors, should be provided from a common resource base. This was because, by so doing, more effective operation of hardware having higher standards and greater compatibility could be achieved over a longer period at greater economy. In 15 years, this thesis has been repeatedly proven.

Physically, the range stretches for more than 10,000 miles southeastward from Cape Kennedy to 90 degrees east longitude in the Indian Ocean. In effect, the range is a network of scattered segments. These segments include two major mainland sites at Cape Kennedy and Patrick AFB, Fla., connected by underwater cable to four of seven large off-shore instrumentation stations. There are also 28 associated smaller sites located on the eastern coast of the United States; in the Bahama Islands and Africa; and in Caribbean, South Atlantic and Indian Ocean waters. The range also has a fleet of 16 instrumentation and other support vessels, and a fleet of test support aircraft. Collectively, these assets represent a capital investment in excess of $1.5 billion, which qualifies AFETR as the largest test establishment in the world.

Cape Kennedy, officially Cape Kennedy Air Force Station, is a combination launch site, control center and instrumentation complex. DOD and NASA test organizations, together with their contractors, work in assigned operating facilities in the Cape's industrial area. Elsewhere on the 25-square-mile reservation are all the other facilities essential to test support: 19 active launch areas, propellant storage, special shops and laboratories, fire and rescue centers, a deep water port and a 10,000-foot long landing strip for the air delivery of launch vehicles. With the advent of manned space flight, additional special facilities have been added, including a Bioastronautic Operational Support Unit (BOSU) in support of a launch-site man-recovery system.

A twofold comparison demonstrates the magnitude of the Cape Kennedy operation. The Cape's security guard activity is about as large as the uniformed police force of a city the size of Tampa, Fla. The electrical power consumed at the Cape could also meet the daily requirements of a city that size.

Patrick AFB, located 15 miles south of the Cape, is the headquarters site for AFETR and the general staging center for support of range operations. All AFETR and resident Aerospace Rescue and Recovery Service, Air Defense Command, Military Airlift Command and transient aircraft are based and maintained there. A huge technical laboratory houses the primary data reduction equipment and the largest single photo development facility east of Hollywood. Patrick also serves as the supply and maintenance depot for AFETR activities. The base has a work force of over 9,000, in addition to a military dependent population of about 4,000.

ICBM Row, Air Force Eastern Test Range.

The major AFETR downrange stations all perform similar data acquisition functions, differing in size only because of variations in their instrumentation. The stations are located on the islands of Grand Bahama, Eleuthera, Grand Turk, Antigua, Trinidad and Ascension, and at Pretoria in South Africa. The range also provides communications and logistic support of the Air Force Satellite Control Facility station at Mahe in the Indian Ocean.

AFETR's ocean-going fleet now totals 16, ranging from 17,000-ton Advanced Range Instrumentation Ships (ARIS), used for complex missile reentry tracking, to medium-sized telemetry ships and smaller inter-island support craft. Although the range's vessels are deployed throughout the world, their primary zones of operation are the Atlantic and Indian Oceans. Marine support bases for the ships are operated by the range at Port Canaveral, adjacent to the cape; Trinidad; Recife, Brazil; and Port Louis, on the Indian Ocean Island of Mauritius.

The range has three basic types of test support aircraft designed for general purpose instrumentation missions. There are 11 JC–130 turboprop aircraft for long-range, direct-telemetry reception or pickup from ships, and for ocean search and recovery. Five medium-range, propeller-driven C–131's perform radio interference and general surveillance tasks. Nine JC–135 jets for high-speed, long-range telemetry missions are currently being phased in. Some of these jet aircraft will also be equipped with Airborne Lightweight Optical Tracking Systems (ALOTS), now undergoing final engineering evaluation on the range.

Technological progress at AFETR went through a number of development stages. Initially, the range was oriented almost exclusively to cruise (aerodynamic) missiles, such as the Martin Matador, Northrop Snark and

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FROM THE SPEAKERS ROSTRUM

Excerpt from address by Maj. Gen. J. W. O'Neill, USAF, Commander, Electronic Systems Div., Air Force Systems Command, at the National Telemetering Conference, Boston, Mass., May 12, 1966.

Maj. Gen. J. W. O'Neill, USAF

Thank you for this opportunity to discuss the Air Force Systems Command's Electronic Systems Division's role in telemetry. . . .

You may be aware that the National Telemetering Conference (NTC) was one of the first conferences on space communications and telemetry. During the past 17 years it has continued to grow in stature under the joint sponsorship of the American Institute of Aeronautics and Astronautics (AIAA), the Institute of Electrical and Electronic Engineers (IEEE), and the Instrument Society of America (ISA). . . .

To my mind it is logical and most proper for the AIAA, IEEE and ISA to sponsor the NTC because the industries they represent basically depend upon advanced remote control and telemeter tools to achieve progress in their respective fields.

Now let me get to a part of my story that is closer to home and tell you how the Electronic Systems Division (ESD) got involved. You will recall that the space business is not very old. It started with ballistic missile development in the mid-1950's and very rapidly, thereafter, there came into being some rather extensive ranges such as Cape Canaveral in Florida and Point Arguello in California. At each of these ranges, space/ground instrumentation systems and elements of world tracking nets were developed, each of which was installed at the behest of individual space projects. With the spectacular growth of these range head stations and their nets, it soon became apparent that some overall management would have to be applied to them so that across-the-board master planning could be accomplished and economics made in the total future instrumentation configuration.

The problem was somewhat akin to the early period of aviation when each airline installed its own radio ranges. This got to be so expensive that the airlines were glad to pass the problem and the costs to antecedants of the current Federal Aviation Agency (FAA). Out of the burgeoning growth of the space ranges came the concept of the National Range Division (NRD) which would perform global range planning and play a heavy role in standardization of space range instrumentation.

With the Air Force Systems Command (AFSC) acting as the DOD executive agent for NRD, it soon became apparent that a central agency was needed that would be responsible for development of range instrumentation in response to NRD planning.

AFSC recognized that range instrumentation development would eventually interface quite sharply with ESD efforts on global communications and world-wide space surveillance and tracking efforts. It therefore placed the responsibility for future development at ESD. The thinking was that range instrumentation systems are specialized, ground-based command and control systems within the area of expertise of ESD. In a broad sense, the aeronautics and astronautics elements of the command decided the electronics specialists of System Command should take over this function, and that we did. Having this responsibility is not without its problems, so some portion of my time is devoted to systems development problems directly relating to the electronics being installed in range stations, space vehicles and on advanced global range aircraft. Please believe me, it makes for some very interesting system management problems.

Our job of supporting Air Force test ranges involves many tasks. I'll discuss a few to help you appreciate the scope of our work. Some of our recent efforts have included the:

- **Apollo Range Instrumentation Aircraft (A/RIA)** developed in support of the National Aeronautics and Space Administration (NASA). One of the chief functions of this aircraft will be the reception and recording of information telemetered from the Apollo Command Module.

- **JC–130 Instrumentation Program** in support of the AFSC Space Systems Division. The program is intended to enhance the aerial recovery capabilities of JC–130 aircraft through the development of a telemetry receive, record and data display capability for them.

- **Re-Entry Systems Evaluation Radar (RESER)** being developed for use by NRD, to be used in evaluating ballistic reentry systems in the Pacific.

- **Coherent Signal Processor** being developed jointly by NASA/ESD. This is a doppler system for application to range radars to facilitate precise velocity measurements.

- **Digital Range Safety/Command** Systems being developed for the NRD ranges for use in carrying out the command destruct function necessary when launching R&D boosters, and for other command functions.

Turning specifically to telemetry, I'll review some of the important things we are doing or trying to do. I've already mentioned that we are doing development work for ranges but, over and above this, I think we are concerned with two major efforts. One of these is standardization of telemetry systems; the other is the transition of AFSC telemetry services from VHF to UHF.

First, let's consider standardization. Several groups have tackled this problem of standardizing telemetry systems.

In 1960 this NTC group formed a Telemetering Standards Coordination Committee (TSCC), covering all types of telemetry applications, to serve as a focal point to receive, coordinate and disseminate information, and to recommend and endorse standards, methods and procedures to users, manufacturers and supporting agencies.

On the military side, in 1952, the range commanders of the Atlantic Missile Range, Pacific Missile Range and White Sands Missile Range established the Inter-Range Instrumentation Group (IRIG) for the interchange of information between the ranges on common problems concerning instrumentation. Since the early 1950's, IRIG has been issuing standards, one of which is aimed primarily at the range telemetery systems.

IRIG's efforts undoubtedly prevented utter chaos in the past. However, though standards were continually updated, they tended to lag behind actual practice to some extent. Further, many range users continued to develop unique systems for special applications. These conditions led Dr. Harold Brown, now Secretary of the Air Force, to state in 1962 that inadequate investigation of agency requirements had resulted in non-standard systems. He requested the Assistant Secretaries of the Army, Navy and Air Force to insure maximum adherence to IRIG 1–6–60 standards. Additionally, non-standard telemetery systems were not to be placed on ranges without the approval of the range commanders. Dr. Brown's memorandum recognized that standards cannot be written to cover every conceivable requirement, and that telemetry systems for some programs may have to be tailor-made on a one-time basis. But, it also called for project offices to review and approve such systems that involve ground equipment.

The Assistant Secretary of the Air Force (R&D) responded to Dr. Brown's request by asking AFSC ". . . to initiate an exercise to list all the prime systems, to give the important technical characteristics of the different telemetry systems, and to provide a plan for (a) reducing the number of telemetry systems from the point of view of their compatibility, and for (b) reduction of development costs and of prime contractor engineering efforts." The task was assigned to ESD with technical support from the MITRE Corp.

ESD conducted the study and made recommendations that we think are a starter in getting an effective telemetry standardization program under way. Presently, we are conducting a review of all Systems Command Instrumentation Development Plans; providing engineering assistance to Systems Command divisions and centers; providing technical assistance to System Program Offices for instrumentation compatibility with the ranges; and conducting an independent review of telemetry requirements placed on the ranges.

Looking to the future, we think there is a need for establishing standard telemetry test procedures. This would involve environmental testing and systems testing as well as component testing.

Now, I'll turn to our second major telemetry effort: the transition of telemetry operations from VHF to UHF.

As background I think I should briefly state the two reasons for the transition. One is the interference resulting from mutual use of VHF by the ranges and by the military tactical organizations. The other reason is that the requirements for wideband telemetry necessitated movement to an area of the spectrum where they could be accommodated. In February 1965 the Military Communications-Electronics Board directed the Military Services to shift telemetry activities from VHF to UHF by Jan. 1, 1970.

ESD has been given overall AFSC responsibility for the coordination of this shift. We at ESD consider this coordination to be our most significant role in future telemetry development. This will involve planning the shift, coordinating range procurements, developing new UHF equipment, and establishing a meaningful test program.

How does this transition affect the telemetry industry? Although an exact amount is difficult to obtain, we estimate that DOD, to date, has invested about $40 million since initial efforts at implementing a UHF capability began several years ago. This amount includes equipment development and procurement costs. At the present time, for example, DOD is funding over 70 individual component development efforts in UHF transmitters, receivers and antennas. Further, we have extensive equipment purchases each fiscal year. It is estimated that future costs will total about $70 million distributed over the next several years.

So much for UHF transition. Let me conclude with a few observations on what I see as future trends in telemetry.

First, it seems clear that the number and complexity of spacecraft will increase, along with increased mission durations and transmission distances. This will demand exceptional stability and reliability characteristics in instrumentation, both in the vehicle and on the ground—to say nothing of the requirements for handling greater amounts of data.

Computers will be required during the coming decade for increasingly greater roles in telemetry operations. Several automated telemetry stations are already operational. Some of the advantages are shorter set-up and calibration time, and faster data reduction and presentation.

The greatly increased transmission distance will tend to make lasers more attractive for telemetry applications.

Microminiaturization techniques will be essential in space vehicle telemetry systems and widely employed in ground-based systems as well.

Finally, I think unified systems, in which one system performs the functions of tracking telemetry and command, will predominate on the ranges in the future.

Twice Citizens from Industry

by

RAdm. Richard L. Fowler, USN

Secretary of the Navy Paul H. Nitze has designated 1966 as the 50th anniversary of the Naval Air Reserve. The following article points up some of the contributions made by naval air reserve flyers in the past and comments on some of the advantages of the program:

One of the characteristics which sets man apart from other forms of life on this earth is his historical consciousness. Man records what happens to him and often sits in historical judgment on past generations.

This generation, and the course we sail through the cold war, will some day receive the same judgment. How will we measure up in the academic evaluation to be made by future historians?

The United States and the American servicemen are facing up to the challenge of Vietnam—just as they have to countless other challenges in the past—with courage and with honor. I couldn't be more proud of these young men who fight for all of us in the jungles and rivers, and in the waters surrounding Vietnam.

A year ago, I returned from duty in Vietnam and assumed command of the Naval Air Reserve Training Command. In the past year I have seen a good cross-section of Americans through the personnel in the Naval Air Reserve squadrons and units of my command. The Naval Air Reservists have faced up to many challenges—in World Wars I and II, in Korea, Berlin, Cuba and now in Vietnam by flying urgently needed cargo to Southeast Asia with volunteer crews of reserve officers and men. Winston Churchill said, "To be a Reserve is indeed, to be twice a citizen." It isn't always easy to play the "Twice Citizen" role of a reservist, but the fact that we have men and women who will contribute to their country and its ideals gives me great confidence.

With the reserve forces, as with all aspects of the military, we must look to the future. We must look to the veterans of today's conflict. Many of them will return to civilian life when their active service is ended. These young men are the heart and life blood of the future air and surface naval reserve.

Even more important, they will continue to be, after they return to civilian life, an essential part of the shield of protection which our nation must maintain. Just as it was considered good business to retain the power of the great fleets of World War II by preserving them in mothball storage, the military skills of our veterans must be retained.

Our reserve forces are built upon a framework of men who have military experience and who learned leadership and responsibility in World War II and Korea. We must now do everything possible to encourage the young men of this conflict to continue their naval careers as selected reservists.

When you consider, for example, the availability of pilots in our Naval Air Reserve squadrons today, you can see the urgency of our need for the veterans of Vietnam. Since 1960 we have been faced with a declining number of available aviators to fill our billets. Peacetime training rates of the Naval Air Training Command in the late 1950's and the early 1960's, which were based on fleet needs at the time, were not sufficient to give us the pipe-line flow of aviators we need from the fleet.

Because of Vietnam and other factors, pilot training rates have been accelerated and more young aviators per year are now reporting to the fleet. In the meantime, we are in competition with the airlines and with industry for these young tigers. Additionally, many of them are reluctant to affiliate with the reserve in the first few years after returning to civilian life. This is due to the adjustments of taking up occupations, moving and settling their families and other factors. They tend to disappear into our population and are often lost to us.

RAdm. Richard L. Fowler, USN, Chief of Naval Air Reserve Training, is a veteran naval flyer with service in the Pacific during World War II. Before taking command of the Navy's Air Reserve Training program he was Commander U.S. Taiwan Patrol Force, the watchdog of the Seventh Fleet in the Far East.

Also, there is a reluctance existing in some segments of industry to have their employees participate in the reserves. Some employers are concerned that an interest in the Naval Air Reserve or other reserve force will reduce the value of an employee since he might be recalled to active duty if the nation mobilizes.

The type of man we must have in the reserve will be a valuable employee. If he cannot perform for his employer, then our interest in him will be limited.

Often, in large organizations, a favorable upper-echelon attitude toward reserve affiliation of employees is not reflected at the personnel manager or the foreman level. This does occur and it can be remedied by the attention of top management.

There are many advantages to an employer from employees who are members of the reserve. Our naval reservists are constantly training. They learn technical skills, administration, leadership and responsibility. These make more valuable and more reliable employees, and can save the employer a considerable amount of training time and money since he does not have to duplicate the training.

One reservist told me that since he owned his own small business he could not really afford to take the time away from his business one weekend a month to drill with his squadron. But he stayed with the reserves—he took the time he couldn't afford to take. He stayed because he discovered that just getting away from the pressures and realities of business for one weekend a month refreshed him. Working two days a month as a reservist was a tonic, a change of pace that took his mind off business. When he returned to his office on Monday morning, he was much more effective.

Since the early days of the Revolutionary War, when Paul Revere rode through the night summoning the Minutemen, America has relied heavily on its citizen-patriots.

Americans have always been willing to stand up for their country when it needed them and they are willing today. Our industry and our communities must help them to realize that today's citizen-patriot needs to be more than willing to stand up when the bugle calls. Our world has become very complex and so have the military arts. Our minuteman of today must spend time to be trained before he is called.

If the tradition of the citizen patriot is to continue to be a strong and vital force in the character of America, then both veterans and employers must recognize the value and respond to the need for a strong, well trained reserve military force.

(Continued from Page 15)

Boeing Bomarc. These early missiles were followed by the North American Navaho, Fairchild Bull Goose and Martin Mace. Most of these programs were tested in the 1950's.

In response to recommendations in the von Neumann Report (an analysis of Air Force missile technology), intercontinental ballistic missile (ICBM) development was accorded the highest national priority in 1954. As a result, AFETR underwent a period of radical, urgent redesign and augmentation. The range emphasis changed from long duration, cruise missile coverage to a much more accurate trajectory measurement capacity.

There followed in quick succession an entirely new category of weapon systems—the Douglas Thor, Convair/General Dynamics Atlas, Chrysler Jupiter, Martin Titan and Lockheed Polaris. These were the first generation ballistic missiles that laid the groundwork for more advanced missiles, such as Boeing Minuteman and improved models of Titan and Polaris, and future space efforts.

Several factors stand out in the course of AFETR's growth to keep pace with the exploding technology that has characterized large-scale testing in the last decade. There has been constant pressure for improved instrumentation accuracy, coverage and capacity. High-speed computers for handling complex mass equations are mandatory. Sophisticated communications equipment is now commonplace.

Data acquisition systems advanced from modified World War II radars to long-range, pinpoint-accurate equipment. In fact, keen competition ensued between the men who developed the rockets and those who made ground support elements. For example, in the late 1950's General Electric's Mod III missile guidance system showed an order of accuracy beyond anything available to measure it. This led the company's tracking equipment engineers to come up with the Precision Missile Trajectory Measurement (MISTRAM) system.

Elsewhere in the search for new range equipment, General Dynamics developed the AZUSA and GLOTRAC continuous wave tracking system. The Radio Corporation of America produced the Missile Precision Instrumentation Radar (MIPR) family of fixed and transportable radars capable of locating space objects within .05 miles in azimuth/elevation and to within 50 feet in range. Several new, large telemetry dish antennas appearing on the range are prototypes in their class. Radiation, Inc. is a pioneer contributor to such developments. The new Telemetry Central (TEL IV) tracking system, now being completed on the range, incorporates the efforts of Defense Electronics, Monitor Systems, Telemetrics Beckman Systems, Electro-Mechanical Research and General Dynamics. At downrange stations, Space General has provided many of the recently installed telemetry receivers.

To meet the surge in ballistic missile testing and the need for high resolution, long-range optical tracking devices, Parkin Elmer and J. W. Fecker developed the Recording Optical Tracking Instrument (ROTI) and Intercept Ground Optical Recorder (IGOR), respectively. Under ideal operating conditions, these instruments can photograph an object the size of a baseball 100 miles away. To use a more graphic illustration, under the same conditions either instrument would permit an umpire in Philadelphia to call balls and strikes in New York City's Yankee Stadium.

From its earliest days, AFETR has had an intense and continuing requirement for a high performance data reduction capability. This requirement was met only after the development of advanced data processing equipment by such industrial concerns as International Business Machines and Control Data Corp.

The development of spacecraft followed naturally and closely on the heels of the accelerated ballistic missile programs. In October 1957, the launch of the Soviet Union's Sputnik I rudely shook the nations technological complacency. The U.S. satellite effort was still in the assembly and checkout stages at Cape Kennedy. The first successful American satellite did not go into orbit until January 1958.

From this somewhat inglorious beginning have evolved the increasingly successful and sophisticated achievements that have become synonymous with Cape Kennedy. Pioneer, Explorer, Ranger and Mariner became famous spacecraft names. In launch vehicles, the names were Thor-Delta, Atlas-Agena, Atlas-Centaur, Saturn and Titan, to name a few.

The nation's manned space flights got under way in 1961 with the Redstone-Mercury launches. Manned Atlas-Mercury and Titan-Gemini launches followed. These are to be followed by the Saturn I-Apollo earth orbital and Saturn V-Apollo lunar exploration flights.

It is not always evident that the success of Cape Kennedy's missile and space missions depends on intricate, highly integrated ground support. This is the role AFETR is currently most heavily engaged in. This role will become even more pronounced in the future.

In the uncertain art of forecasting, several facts and considerations bearing upon AFETR's future stand out. Eastward launches assure the greatest payload-to-booster thrust ratios and orbital coverage of the most heavily populated latitudes of the the earth's surface. Cape Kennedy is ideally situated (within six degrees of the ecliptic plane) for lunar/interplanetary launches. The cape is the nation's most conveniently located launch site for equatorial or synchronous orbits.

In this context, the Air Force Eastern Test Range's greatest legacy to the nation's space objectives is probably in the area of things as yet uninvented and places as yet unexplored. Whatever the future, much of the foundation, tradition and existing national talent in the realm of "range art" had its beginning at Cape Kennedy.

Aeronautical Planning Seminar Proceedings Available

Copies of the proceedings of the Air Force-Industry Planning Seminar on Aeronautical Systems, held at Wright-Patterson AFB, Ohio, March 23-25, 1965, are now available to interested industrial organizations.

Because the document is classified Secret, the proceedings will be available only to industrial concerns with proper security clearance and need-to-know.

Request should be forwarded through the appropriate Defense Contract Administration Services Region to the Defense Documentation Center, Cameron Station, Alexandria, Va. 22314. The document is identified by DDC No. 373116.

Total Package Procurement Concept

(*Continued from Page 12*)

deficiencies, ensures that we will not be looking over your shoulder and "helping you" engineer and produce as much as we have in the past. But the nature and degree of disengagement still requires case-by-case determination and we intend periodically to review progress in this regard on the C–5.

A few quick words on the Systems Project Office (SPO) manning. Since the C–5 TPC competition, there has been considerable discussion on this subject. We in the Air Force are impressed with the need for comprehensive manning of our program offices at the outset of the program—before we write the RFP. Adequate manning is an urgent requirement under today's environment—where the RFP, CDP and the contract fix the parameters of the program in considerable detail. The SPO can no longer "grow with the program." There is good reason to believe that the maximum number of people are needed at the outset—with some tapering off downstream. A major review of our SPO manning precepts is indicated.

Finally—what is the future of the TPC?

The already demonstrated benefits of applying TPPC to the C–5A program have been enough to engender considerable interest in the concept. Identification of and preparation for total package contracting in the Air Force Short Range Attack Missile (SRAM) and the Navy Fast Deployment Logistics (FDL) programs attest to this fact. The Director of Defense Research and Engineering has asked the Air Force for a comprehensive analysis of its C–5A procurement experience to be distributed through his office to all secretarial levels in the Office of the Secretary of Defense. The Assistant Secretary of Defense (Installations and Logistics) has asked the Air Force to prepare a statement of broad policy guidelines for the application of the concept for DOD-wide implementation through the Armed Services Procurement Regulation.

How wide an application the concept will have within DOD is a function of many variables, some of which pertain to the basic requirements of our defense posture and its relationship to conditions in a constantly changing world. Other variables depend primarily on the selection techniques used to identify those systems that should be acquired to fulfill those requirements. Within these constraints, the extent to which the concept might be applied is a function of the benefits to be achieved weighed against the disadvantages to be endured on the basis of a case-by-case analysis of the procurement involved. In view of TPC's overwhelming success to date in the C–5A program, maximum efforts are rightfully being made to eliminate, insofar as is possible, the problems that I have discussed here and many, many more.

In summary, a review of our experience with TPC thus far reveals that:

- Data has increased substantially due to CDP, TPC and Air Force Systems Command Manual (AFSCM) 375–5.
- The multiplicity of new concepts, changes and clarifications created major problems in competitive environment.
- The extent of detail data submittal was excessive due to newness of concept and over-reaction of contractors.
- Some redundancy in data submittals has occurred.
- Systems engineering (AFSCM 375–5) is conceptually compatible with TPC but requires considerable refinement.
- Configuration management (AF SCM 375–1) is compatible with TPC with minor refinement.
- Data management (AFSCM 310–1) is compatible with TPC. However, much more discipline is needed.
- Source selection process can be simplified. Some progress has been made, but much more is considered possible.
- The basic purpose of the TPC was achieved in the C–5A.
- The TPC contracting technique will continue to be studied with the objective of deriving more benefits. The success of this will largely depend upon the diligence and the vision of both industry and the Air Force in applying this concept to future programs.

Price Increase for Quinine and Quinidine Subject of Senate Hearing

The price increase for quinine and quinidine was the subject of hearings conducted on May 18, 1966, by the Senate Antitrust and Monopoly Subcommittee of the Committee of the Judiciary. Shirley C. Fisk, M. D., Deputy Assistant Secretary of Defense for Health and Medical, was the principal witness for the Defense Department.

The purpose of the hearings was to ascertain the cause of the price increase which, for both drugs, was eight to tenfold. Since the source of both quinine and quinidine is controlled primarily by European processors, the subcommittee investigated the possibility of collusion or price fixing following announcement by DOD of significant requirements for quinine in 1964.

Detailed information was provided to the subcommittee by DOD on requirements and methods followed in attempting to purchase the drugs and the principal suppliers in the United States. Testimony was given on DOD knowledge of the market and supply.

At the conclusion of the hearings, the subcommittee requested the Department of Justice to investigate the possibility of price fixing by European firms in providing quinine and quinidine to importers in this country.

Total DOD requirements for quinine have been obtained by release from the National Stockpile. No quinine has been purchased from commercial sources for several years. Some of DOD requirements for quinidine have been provided from stockpile quinine in order to relieve pressure on the civilian market. This method of procurement will be continued until the supply and price situation becomes stabilized. The stockpile assets are adequate to meet DOD demands for the foreseeable future.

Control Pages of Classified Documents

A frequently posed question by recipients of classified documents is: "How should accountability be established for individual pages extracted from formal documents?" This problem develops whenever a classified document is "cannibalized" and pages from it are used in the preparation of another classified document.

A recommended procedure is to establish a subcontrol station to maintain individual pages and accounting records as well as a listing of the pages and descriptive data. To maintain control, use a charge-out card system which provides space for indicating the ultimate disposition of each page.

The New Look of Our Correspondence School

(*Continued from Page 3*)

and development effort, the Correspondence School is ever alert to opportunities to add to the freshness and vigor of student instruction. In 1963, responding to the heightened emphasis on management in the Resident Course, the Textbook Development Group produced a new foundation text, "Management: Concepts and Practice." The group contributed to the development of a Resident School anthology on counterinsurgency and, in turn, adapted it to correspondence instruction by publication of a text titled "New Dimensions in the Cold War: Transition and Tension in the Underdeveloped World."

Similarly, paralleling the current emphasis on scientific decision making in the resident curriculum, the Correspondence School will soon publish a text on "The Department of Defense Planning-Programming-Budgeting System." This text embodies the thinking of the three principal architects of the contemporary approach to decision making: Secretary of Defense Robert S. McNamara; Charles J. Hitch, former Assistant Secretary of Defense (Comptroller); and Dr. Alain C. Enthoven, Assistant Secretary of Defense (Systems Analysis). The student will thus gain a deeper insight into Mr. McNamara's quest for options and his emphasis on analyses of cost and effectiveness in deciding on the best allocation of resources for Defense programs.

The so-called "systems analysis" approach in the Pentagon, it will be made clear, strikes deep in the past; it represents extension of techniques of economic analysis long used in industry and of the systematic discipline employed in military operations research since World War II. The student will find in this text not a detailed account of techniques and methodologies, but an elucidation of the broader aspects of this emerging discipline—its essential characteristics, its applications, its strengths and, indeed, its limitations in top-level decision making. Computers and operations research techniques, the student will learn, can never replace value judgments, but they can help to provide the factual and analytical basis for informed and reflective judgment. A study of this text will bring out what is at the heart of Mr. McNamara's approach—his insistence on the application of greater objectivity, logic and explicit analysis of the issues and alternatives in considering the best Defense policy to attain national security objectives.

Forward Planning.

By mid-1965, the Correspondence School had reached a full cycle of textbook development and revision. Though its texts were then on a solid footing, the school embarked on a new program marking a substantial adjustment of its curriculum to reflect a number of changes fundamental in the Resident Course. The changeover, scheduled over a three-year period, will see the phaseout and replacement of 10 of the 22 texts currently in use. It poses a formidable challenge in developing the new texts as well as in realigning, adapting and updating existing texts.

As fully developed by mid-1968, the new National Security Management course will closely parallel the current structure and content of the Resident Course. Along with a tightening and updating of existing texts, several gap-areas will be filled. Science and technology, for example, will be treated as a basic national resource, and Defense research and development will receive separate and comprehensive coverage. A full text will be devoted to Defense organization and management, highlighting the road to unification, the progressive centralization of authority in the Secretary of Defense, the strengthening of the Joint Chiefs of Staff, and the creating of other agencies and instruments to support and assist the Secretary in managing the many varied and far-flung activities of the Defense Establishment. As indicated, one such instrument, the Department of Defense Planning-Programming-Budgeting System, will be given special emphasis in another full text, as part of the college's continuing effort to enhance the development of military and civilian officials who are better informed and better equipped to meet present and future challenges to our national security.

While seven of the 22 texts in the new series will be devoted specifically to Defense logistics management, due account will be taken of the total "balance sheet" of our national strength and liabilities. The series will continue to stress the interwoven relationships of our managerial, scientific, industrial, economic and social institutions, and the management problems and challenges in marshalling these institutions in support of national policy. Appropriate attention will be given to the planning for peace as well as for war—maintaining high levels of economic growth and stability; effecting the proper distribution of basic goods and services; raising living standards, national health, education and science programs; working with our allies in the pursuit of peace and security; and assisting the emerging nations of the world in their struggle for maturity and independence. At the same time, the student will be impressed with the fact that in today's shrunken world, with no clear lines discernible between peace and war, it is all the more important that our total resources and managerial talent be readily adaptable to changing conditions. He will see how the Government, in concert with industry, labor, the professions and the public, seeks to ensure orderly planning for the prompt and effective redirection of the economy to emergency needs.

An Opportunity for Self-Development.

Our Correspondence Course is not designed to train specialists, but specialists and generalists alike will profit immeasurably from close, disciplined study of the 22 bluebooks comprising the course. These are not broad-brush presentations, and the course is not a "snap." It generally takes 12 to 15 months of diligent application to complete this course. A comprehensive evaluation examination is administered on each unit to measure learning achievement.

Only energetic students can hope to complete the course successfully. Only 50 percent do, and some 71 percent of all graduates hold at least a bachelor's degree. The course is open to select clientele: military officers of all components of the Department of Defense and the Coast Guard serving in active or inactive status in the grade of major or lieutenant commander and above, civilian executives, members of the several professions, Federal employees with ratings of GS–11 and above, and certain military and federally employed nationals of friendly foreign countries.

Reserve officers not on extended active duty may earn a total of 48 credit points for retention and retirement purposes. Satisfactory completion reports on military personnel and Federal employees are submitted to the appropriate department or agency for suitable entries in their official records. A certificate of completion, signed by the Commandant of the Industrial College, is issued to everyone who satisfactorily completes the course. Distinguished graduates are accorded special letters of recognition.

All course materials are provided at no cost to the students. Each student completing the course is allowed to retain the full set of textbooks for his personal library. In most instances, they will remain on the graduate's bookshelf within easy reach for re-reading and reference.

Graduates are placed on the distribution lists for additional publications to help them keep abreast of new developments in the national security management field. Throughout their enrollment, students are encouraged to submit questions and comments; and a faculty adviser assists them in obtaining maximum benefits from the course.

Apart from these special incentives of reserve credit points, certificates of completion, and the opportunity to acquire a unique collection of bluebooks, there is the boundless satisfaction of having undergone a rich educational experience. Other than direct involvement in the resident program, there is no better way to make acquaintanceship with the full spectrum of resource management for national security. The course goes far to broaden the student's horizons and sharpen his professionalism. For the individual who seeks to fill gaps, to keep alert, and to expand his interests in a vital field, this off-post National Security Management Course is a "must". The graduate's greatest reward will lie in the knowledge that, through this extra effort, he will help provide a firmer foundation for the civilian-military teamwork which is so vital to the preservation of freedom here at home and around the world.

Applications and inquiries concerning the Correspondence Course, "National Security Management" should be addressed to the Commandant, Industrial College of the Armed Forces, ATTN: Correspondence School, Fort Lesley J. McNair, Washington, D.C. 20315.

Agenda Announced for AOA Annual Meeting

"Military Aircraft of the Future," is the theme of this year's annual American Ordnance Association Defense Preparedness Meeting to be held Oct. 5–6, in Los Angeles and at Edwards AFB, Calif.

The two-day meet is being held to provide an opportunity for the U.S. Air Force, this year's host Military Service, to discuss future military aircraft. Following is the agenda:

Oct. 5 Century Plaza Hotel (L. A. Room), Los Angeles, Calif.

0900 – 0910	Welcome and introduction.
0910 – 0945	"The Challenge Ahead" Maj. Gen. Jerry D. Page, Commandant, Air War College and Vice Commander, Air University.
0945 – 1020	"The Technological Base" Brig. Gen. Robert C. Richardson III Dep. Commander, Defense Atomic Support Agency Field Command, Sandia Base, N.M.
1020 – 1050	Break
1050 – 1125	"Limited War" Brig. Gen. Henry B. Kucheman Jr. Dep. for Limited War, Aeronautical Systems Div. Air Force Systems Command.
1125 – 1200	"The Challenge of the Reconnaissance Mission" Maj. Gen. Milton B. Adams Commander, Tactical Air Command Air Reconnaissance Center.
1200 – 1400	Refreshments and luncheon (Santa Monica and Beverly Hills Rooms)
1400 – 1435	"The Challenge of the Strategic Mission" Lt. Gen. William K. Martin Commander, 15th Air Force, Strategic Air Command.
1435 – 1510	"The Challenge of the Tactical and Close Support Mission" Brig. Gen. Robert F. Worley Asst. Deputy Chief of Staff (Operations Command and Control), Tactical Air Command.
1510 – 1540	Break
1540 – 1615	"The Challenge of the Air Defense Mission" A speaker from the Air Defense Command will be announced.
1615 – 1650	"The Challenge of the Air Transport Mission" Maj. Gen. George S. Boylan Jr. Dep. Chief of Staff (Plans), Military Airlift Command.
1930 – 2130	Banquet (Los Angeles Room) Guest of Honor and Speaker: General J. P. McConnell, Chief of Staff, U.S. Air Force.

Oct. 6 Air Force Flight Test Center, Edwards AFB, Calif.

0730	Depart from Century Plaza Hotel.
1000 – 1200	Orientation briefing (theater).
1200 – 1300	Observation of scheduled flying.
1300 – 1400	Lunch.
1400 – 1630	Static displays, tours and briefings.
1630	Depart for Century Plaza Hotel.

DEFENSE PRIME CONTRACT AWARDS TO SMALL BUSINESS

(AMOUNTS IN THOUSANDS)

	July 65–May 66	July 64–May 65
Procurement from All Firms	$28,422,838	$21,879,496
Procurement from Small Business Firms	6,287,421	4,467,043
Percent Small Business	22.1	20.4

DIPEC—A Source for Needed Industrial Plant Equipment

The Defense Industrial Plant Equipment Center (DIPEC) at Memphis, Tenn., is a vital source of assistance to Government agencies and defense contractors in meeting military commitments, especially in times of emergency.

Since its establishment in 1963, DIPEC has continued to supply contractors with vitally needed items of industrial plant equipment (IPE) which could not be purchased by industry in sufficient time or quantities to meet production requirements. The present Southeast Asia buildup is an example of how this type of help can be used advantageously.

The center was established to achieve greater economy through redistribution of idle equipment. It is responsible for assuring that one DOD component does not procure a new item while another component has a similar item not being used. Although DIPEC is under mandatory requirement to service DOD components, it also provides certain equipment by agreement to other Government agencies, such as the National Aeronautics and Space Administration and the Atomic Energy Commission.

At its Memphis headquarters, DIPEC holds either technical or operational control over six equipment storage and repair/rebuild sites from which equipment is shipped to users.

DIPEC now maintains records on a total inventory of some 331,000 items of equipment valued at about $3.5 billion. This inventory encompasses items of metalworking, electrical-electronic, test and general purpose industrial plant equipment used in the research, building, testing and maintaining of weapon systems and other defense materials.

Under a Defense Supply Agency Industrial Equipment Reserve (DSAIER) program, DIPEC manages an industrial plant equipment package reserve which consists of machine tools and other items necessary to the production of a military end item not immediately available on the market. These packages are designed for producing items common to the Services, such as landing mats, concertina wire, steel helmets and liners, mess gear and kitchen equipment, tents and other basic equipment. Packages presently in reserve are valued in excess of $5 million, with another $8 million worth now being brought into the program as a result of transfer of management responsibility from the Army to the Defense Supply Agency.

Since becoming fully operational, DIPEC has shown its ability to support its customers through efficient reutilization of its assets. It is now screening an average of 3,150 requisitions a month against its idle inventory.

In FY 1965, DIPEC effected reutilization of more than 18,000 items of equipment valued at more than $101 million. Through the first eight months of FY 1966 redistribution of idle equipment amounted to $102 million.

DIPEC's contributions toward the economy and the military effort have been noteworthy. Some examples of savings to the Government are:

- Four 1,000-ton mechanical presses were furnished the Army's Ammunition Procurement and Supply Agency, Joliet, Ill. The acquisition cost of these items totalled more than $500,000.
- Three 1,600-ton mechanical presses for use on the Bomb Demolition M–117 program, with a total acquisition cost of $556,650, were also provided for the Army.
- An impact hammer with an acquisition cost of $165,090 was shipped to the Bell Helicopter Co. in Fort Worth, Tex., for use on the Army's UH–1 helicopter production program.
- A milling machine, which originally cost the government $167,712, was supplied to the Martin-Marietta Co. of Baltimore, Md., for use on an Air Force production program.
- A boring and turning machine, declared idle at the General Electric Co. at Burlington, Vt., was moved to the Philadelphia Naval Shipyard to replace an older machine. Acquisition price of the idle machine was $126,025.

In the midst of these achievements, DIPEC continued the difficult and time-consuming task of developing standards for describing industrial plant equipment. Commonly understood terms permit the cross-servicing of equipment (which hitherto was often blocked by terminology familiar enough to one agency but obscure to another) and provide for a more efficient utilization of electronic data processing.

DIPEC has also been involved in developing a subclassification coding system within the Federal Supply Classification (FSC), known as PEC's, or Plant Equipment Codes. The PEC's not only embody the FSC but identify type, size, capacity and other characteristics of the item.

DIPEC develops, publishes and maintains IPE handbooks that include the production equipment code cross-referenced with nomenclature, the nomenclature cross-referenced to the PEC, item description by manufacturer, and guides for preparing description of IPE.

Publication of all handbooks covering the entire DIPEC scope of 88 FSC's is scheduled for completion by November 1966. These will provide more than 100,000 individual identifications by manufacturer's part/model number and will specifically identify items of in-use and idle IPE to be reported to DIPEC or to be screened by DIPEC prior to procurement.

These will greatly facilitate management of IPE throughout the DOD.

As a part of its responsibility to maintain a balanced reserve of IPE, DIPEC manages the National Industrial Equipment Reserve (NIER) program under Public Law 883. This provides for a national reserve which may be loaned, leased, or transferred to other Government agencies, non-profit educational institutions, or training schools, and may be used by private industry in the event of emergency. In recent years, considerable emphasis has been given to loaning NIER equipment to vocational training schools.

The first loan of NIER equipment to a school was authorized in late 1958 and since that time interest in the program has grown to considerable proportions. Requests have been received from almost every state, including Hawaii. Through Dec. 31, 1965, there were 141 loans to schools and two to Job Corps camps. These loans covered 3,917 items of equipment valued at about $16,374,000.

Approval of these loans does not affect the DOD surplus property program under which educational institutions and training schools may acquire surplus tools as they become available.

Some of the more far-reaching benefits expected to accrue from this facet of the NIER program are:

- A reserve of skilled labor of unlimited value in the event of mobilization.
- The retention of a reserve of Government-owned machinery on a dispersed basis.
- A saving to the Government of processing, storage and maintenance costs of the loaned equipment.

Among Federal agencies benefiting from DIPEC's program is the U.S. Treasury Department. A total of 61 items valued at more than $632,000 has been made available to assist in relieving the coin shortage. DOD-owned presses on loan to U.S. Mints provided the additional capacity to increase FY 65 production to eight billion coins. The total FY 64 production was 4.3 billion.

Through an agreement between the Defense Supply Agency and the Federal Aviation Agency (FAA), FAA contractors are obtaining loans of idle DOD industrial plant equipment for use on the Supersonic Transport (SST) Development Program. Although the final SST contract will not be awarded until December 1966, FAA is authorizing two airframe and two engine contractors to screen the DIPEC idle reserve for equipment to aid in improving design and for building full-scale models of the SST.

Defense contractors also are saving dollars for the Government by using idle IPE. A Massachusetts firm needed two grinding machines for use on military engine production programs. DIPEC made the machines available from its Terre Haute, Ind., storage facility.

In another case, a New York company required an all-weather chamber as part of a vibration test facility called for in the manufacturer's contract. DIPEC directed shipment of the chamber, which was in process of being placed in idle storage, thus saving the Government at least $218,530.

A furnace, required by a contractor at Hartford, Conn., had been declared idle and marked by DIPEC for shipment to one of its storage sites. In cooperation with the Bureau of Naval Weapons, DIPEC returned the furnace to active use to increase production of aircraft engines at the Connecticut plant.

In a variety of ways, DIPEC is continuing to aid the nation's defense effort and save the taxpayer's money by its efficient reutilization of equipment. In addition, it is providing the buildup of a reserve of skilled personnel through its loan of equipment to vocational training schools.

Cost Reduction Report

(Continued from Page 5)

Shifting from Cost-Plus-Fixed-Fee (CPFF) to Fixed-Price Contracts. The first ten months of FY 1966 show a continuing decline in the proportion of CPFF type contracts awarded, reaching a rate of 8.9 percent compared with the peak of 38 percent recorded in March 1961.

CPFF contracts, while being the easiest to award are the most difficult to administer, and more important, provide little or no incentive for the contractor to hold costs down or meet performance and delivery specifications. Because they do permit work to get under way rapidly and are particularly suited to highly uncertain situations, we have had to use CPFF contracts in the case of a number of Vietnam-related projects, for example, the construction of U. S. military facilities in that country. Despite these unusual requirements, we were able to show further progress in FY 1966. Since on the average at least ten cents is saved on each dollar shifted from CPFF to some other form of contract, this means an estimated saving of $684 million. Again, the actual results of the last two months may increase the CPFF rate somewhat, but we should still be able to better the goal set for the year.

As the proportion of CPFF contracts has declined, that of firm, fixed-price contracts has risen, and by virtually the same amount. This is especially gratifying inasmuch as under most conditions, the firm, fixed-price contract is preferable, with the contractor assuming full cost responsibility and guaranteeing performance and timely delivery.

Multi-year Procurement. Multi-year competitive contracts enable bidders to offer the Government lower prices since the larger quantities and longer production runs usually result in lower unit costs, as shown below:

FY 1964

Number of Actions	42
Value of Actions	$230 million
Savings	$7 million
Rate of Savings	3.2 percent

FY 1965

Number of Actions	129
Value of Actions	$854 million
Savings	$69 million
Rate of Savings	8.1 percent

FY 1966

Number of Actions	193
Value of Actions	$850 million
Savings	$80 million
Rate of Savings	9.4 percent

SUMMARY

With a record of five years of achievement behind us, there should be no question as to the value of the Defense Department's Cost Reduction Program. Not only has it produced very substantial savings but also it has significantly improved the overall efficiency of our logistics system, as evidenced by its ability to support promptly the sudden increase in workload imposed by the conflict in Vietnam. Six weeks ago Senator Douglas, speaking as Chairman of the Subcommittee on Federal Procurement and Regulation summed up the Committee's annual review of our Cost Reduction Program with the following comment:

> **". . . cost reductions of several billions of dollars annually have been achieved by adopting, among others, many of the suggestions of this subcommittee. In the process, . . . toes have been trod upon, oxen gored, and hostility encountered which is inevitable.**
>
> **"Errors may have been committed and certainly much remains to be done in carving more fat and waste . . . but I urge everyone to view our suggestions and recommendations against the background of the scope of the job and the unprecedented accomplishments. We must not undermine . . . the greatly improved structure . . . nor . . . relax our efforts toward further progress."**

It is my intention to ensure that there is no relaxation of effort and that further progress is achieved in the year ahead.

Competitive Procurement of Ocean Freight Service Announced

The Defense Department has initiated the first step in a new system of competitive bidding from the maritime industry for moving military cargoes on regularly scheduled commercial ships.

On June 16, 1966, the Commander of the Military Sea Transportation Service (MSTS) requested competitive proposals from the maritime industry on shipping rates for the transportation of military cargoes between Atlantic, Gulf and Great Lakes ports of the United States and ports in the United Kingdom and northern Europe. The deadline established for receipt of proposals was July 20. Awards will be made within three weeks of that date. The effective date for shipping military cargoes under the new system for the North Atlantic is August 31.

The Federal Maritime Commission (FMC) held hearings, now completed, on tariffs and rates for military goods moved in ships belonging to shipping conferences and in ships not belonging to such conferences. Mr. Robert C. Moot, Deputy Assistant Secretary of Defense (Logistics Services), in testimony before the FMC on April 4, 1966, stated that DOD planned to institute a system of competitive rate bidding for sealifting military cargoes. Mr. Moot testified that DOD, through the Navy's Military Sea Transportation Service, would no longer purchase shipping space on the basis of prices negotiated through shipping conferences or associations. The latter procedure had been followed by MSTS since 1950.

The Defense Department plans for all trans-oceanic shipping trade routes handling military cargoes to be on a competitive basis within the next nine months. The following is the program for each trade route with the dates that MSTS will issue Requests for Proposals and the effective dates for the new system in each case:

North Atlantic: June 15, 1966
  Effective date: Aug. 31, 1966.
Far East: Aug. 1, 1966
  Effective date: Sept. 30, 1966.
Mediterranean: Sept. 1, 1966
  Effective date: Oct. 31, 1966.
Inter-port trades: Nov. 1, 1966
  Effective date: Dec. 30, 1966.
Caribbean: Oct. 1, 1966
  Effective date: Nov. 30, 1966.
Miscellaneous (principally Persian Gulf and Atlantic ports of Spain): Dec. 1, 1966
  Effective date: Jan. 31, 1967.
Routes on which only one U.S. flag carrier now performs service: Jan. 2, 1967
  Effective date: March 1, 1967.

Booklet on O-Ring Compounds Available

"Know Your O-Ring Compounds," a booklet compiled by the Defense Industrial Supply Center (DISC), Philadelphia, Pa., is now available to research and development activities to assist them in designation selections of preferred items of supply.

The pamphlet provides a cross-reference between O-Ring fabricators' synthetic rubber compound designations and Government specifications and standards.

Through the use of information compiled for this publication, technicians have been able to broaden the procurement base for DISC-managed items, and to provide acceptable substitutes in the Item Entry Control Program.

Data for the publication were provided through the cooperation of commercial sources and the Military Service engineering support activities. Accumulation of data will continue to permit updating and expansion of the cross-reference document in the future.

Copies of the booklet may be obtained by writing to:

Commander
Defense Industrial Supply Center
700 Robbins Ave.
Philadelphia, Pa. 19111

DOD Creates New Directorate To Deal with Food Policies

A Directorate for Food Service Management Systems has been established in the Office of the Assistant Secretary of Defense (Installations & Logistics) to serve as the focal point on all matters pertaining to military feeding.

The primary mission of the new directorate is to formulate uniform food rationing and food service policies for all branches of the Armed Forces.

Creation of the new directorate was the result of a study of food rationing and food service management systems within the Military Services.

The study revealed that the food service program of the Armed Forces is the largest in the United States and pointed out the need for a centralized organization to deal with food service and management problems at the policy level.

The directorate is headed by Captain James A. Warren, USN, and staffed with senior officers from each of the Military Services and a civilian specialist in feeding and systems management.

Shelter Development Program Underway

The Tactical Air Warfare Center (TAWC) and the Air Proving Center (APGC) have embarked on a two-fold shelter program at Eglin AFB, Fla. There is an urgent need to improve and modernize portable buildings by generally keeping pace with improvements already made possible with new materials and methods of construction. These shelters would be used as hangars, maintenance and storage buildings, sleeping quarters, etc.

One part of this two-fold program is to develop shelters, or a family of shelter which, because of the requirement, necessitates a two- or three-year development period. The second, more immediate in nature, involves the procurement for environmental and functional testing of readily available shelters which potentially are superior to those presently being used but may not satisfy long-range requirements.

One such shelter which is presently undergoing tests is the Walter Kidde. This shelter comprises a weatherproof cover supported by inflated tubular structural members. The structural members are flexible and, when inflated with compressed air, they become load-bearing struts which assume a hemispherical shape with each end anchored to the ground. There are full-width openings at each end and vehicle and personnel openings at each side.

Mr. J. F. Huggins at the Climatic Laboratory Project Support Office is the APGC project officer. Major R. F. Arndt is TAWC project officer.

Wire Rope Specs To Change

The Defense Industrial Supply Center (DISC), Philadelphia, Pa., has adopted a suggestion by the wire rope industry to use polypropylene cores in the manufacture of wire rope.

DISC, a field activity of the Defense Supply Agency, has in the past used natural fibers as cores for wire rope.

The center decided to switch to polypropylene after a study revealed that natural fiber centers in wire rope were required only by Government sources. Further, it was determined that, since polypropylene centers are used for all commercial applications, the Government would profit through faster deliveries, lower prices and better quality by changing.

Negotiations have been initiated by DISC with military users to revise specifications to permit the use of the polypropylene centers. Manufacturers of wire rope for the Government have been furnished new and revised specifications.

DEFENSE PROCUREMENT

Contracts of $1,000,000 and over awarded during the month of July 1966:

DEFENSE SUPPLY AGENCY

1—**Raylon Corp., B. G. Colton Textiles,** New York City. $1,184,856. 605,700 yards of cotton and nylon oxford cloth. New York City. Defense Personnel Support Center, Philadelphia.

—**Society Brand Hat Co.,** St. Louis. $1,929,910. 420,240 wool serge service caps. St. Louis. Defense Personnel Support Center, Philadelphia.

—**Pettibone Mulliken Corp.,** Washington, D.C. $3,999,963. 256 diesel forklift trucks. Washington, D.C. Defense General Supply Center, Richmond, Va.

—The following contracts have been awarded by the Defense Fuel Supply Center, Alexandria, Va., for fuel oil and gasoline: **Shell Oil Co.,** New York City. $2,557,107; **Standard Oil Co. of California,** San Francisco. $1,244,155; **Armour Oil Co.,** San Diego, Calif. $1,118,793.

—The following contracts have been awarded by the Defense Fuel Supply Center, Alexandria, Va., for lubricating oils:

Standard Oil Co. of Calif., San Francisco. $2,200,297. 4,037,069 gals.

Texaco, Inc., New York City. $1,439,771. 2,355,110 gals.

Delta Petroleum Co., New Orleans. $1,395,721. 2,420,069 gals.

—**Phipps Products Corp.,** Boston, Mass. $1,027,082. 1,925,982 gallons of petro-chemicals. Defense Fuel Supply Center, Alexandria, Va.

5—**Wheeling Steel Corp., Wheeling Corrugating Div.,** Wheeling, W. Va. $8,796,000. 24,000 metal shipping boxes. Wheeling. Defense General Supply Center, Richmond, Va.

—**Fruehauf Corp., Military Products Div.,** Fullerton, Calif. $10,995,930. 25,278 metal shipping boxes. Fullerton. Defense General Supply Center, Richmond, Va.

—**Dow Chemical Co.,** Midland, Mich. $3,830,568. 505,532 gallons of herbicide. Midland. Defense General Supply Center, Richmond, Va.

—**Eastman Kodak Co.,** Rochester, N.Y. $1,327,753. 27,200 rolls of aerial protographic film. Rochester. Defense General Supply Center, Richmond, Va.

—**Cable Raincoat Co.,** Boston, Mass. $1,050,400. 80,000 men's lightweight raincoats. Boston. Defense Personnel Support Center, Philadelphia.

—**Royal Lubricants,** Hanover, N.J. $1,444,020. 428,461 gallons of aircraft turbine engine lubricating oil. Hanover. Defense Fuel Supply Center, Alexandria, Va.

6—**Klopman Mills, Inc.,** New York City. $1,607,455. 3,986,250 yds of polyester cotton broadcloth. New York City. Defense Personnel Support Center, Philadelphia.

—**Erwin Mills,** New York City. $1,148,660. 573,100 bed sheets. New York City. Defense Personnel Support Center, Philadelphia.

—**Airosol Co.,** Neodesha, Kan. $1,427,800. 2,200,000 cans of insect repellant. Neodesha. Defense General Supply Center, Richmond, Va.

7—The Defense Personnel Support Center, Philadelphia, has awarded the following contracts for combat boots:

Sportwelt Shoe Co., Nashua, N.H. $5,946,442. 530,000 pair.

Cumberland Shoe Co., Franklin, Tenn. $1,930,829. 163,200 pair.

H. H. Brown Shoe Co., Worcester, Mass. $4,306,600. 396,000 pair.

Endicott Johnson Corp., Endicott, N.Y. $1,861,489. 179,000 pair.

International Shoe Co., St. Louis. $1,947,499. 200,000 pair.

Safety First Shoe Co., Nashville, Tenn. $2,997,500. 330,000 pair.

B. B. Walker Shoe Co., Asheboro, N.C. $1,923,250. 175,000 pair.

Brown Shoe Co., St. Louis. $3,305,600. 320,000 pair.

Addison Shoe Corp., Wynne, Ark. $3,416,000. 350,000 pair.

Carolina Shoe Co., Morganton, N.C. $1,240,139. 120,000 pair.

Weinbrenner Division of Textron, Inc. Milwaukee, Wis. $2,438,832. 231,600 pair.

8—**Ingersoll Products Division of Borg-Warner Corp.,** Chicago. $1,614,724. 477,360 steel helmets. Chicago. Defense Personnel Support Center, Philadelphia.

11—**Rubber Fabricator's Inc.,** Grantsville, W. Va. $1,276,700. 170,000 pneumatic mattresses. Grantsville. Defense Personnel Support Center, Philadelphia.

12—**Virginia Tent & Awning Co.,** Norfolk, Va. $2,637,270. 12,000 general purpose tents. Norfolk. Defense Personnel Support Center, Philadelphia.

—**Peoples Co.,** Huntington, W. Va. $2,246,572. 10,700 general purpose tents. Huntington. Defense Personnel Support Center, Philadelphia.

—**South Jersey Clothing Co.,** Minotola, N.J. $1,001,200. 50,000 men's wool serge coats. Minotola. Defense Personnel Support Center, Philaldelphia.

15—**Clark Wire Corp.,** Cleveland, Ohio. $1,369,352. 141,500 coils of concertina barbed wire. Cleveland. Defense Construction Supply Center, Columbus, Ohio.

20—**Ansul Co.,** Marinette, Wis. $1,915,200. 400,000 gallons of herbicide. Marinette. Defense General Supply Center, Richmond, Va.

21—**Longview Fiber Co.,** Longview, Wash. $1,044,576. 2,142,105 fiberboard boxes and sleeves. Longview. Defense Personnel Support Center, Philadelphia.

22—**Interstate Bakeries Corp.,** Kansas City, Mo. $1,230,555. 22,579,008 cans of white bread. Defense Personnel Support Center, Philadelphia.

25—The Defense Fuel Supply Center, Alexandria, Va., has awarded the following contracts for JP–4 jet fuel:

Sinclair Refining Co., New York City. $4,338,600. 42,000,000 gallons.

Sun Oil Co., Philadelphia. $3,269,600. 31,500,000 gallons.

Humble Oil & Refining Co., Houston, Tex. $2,583,000. 25,200,000 gallons.

Cities Service Oil Co., New York City. $1,145,476. 10,500,000 gallons.

27—**Camel Mfg. Co.,** Knoxville, Tenn. $3,088,680. 12,000 general purpose tents. Defense Personnel Support Center, Philadelphia.

—**American Tent & Canvas, Inc.,** LaFollette, Tenn. $2,030,670. 9,000 general purpose tents. Defense Personnel Support Center, Philadelphia.

—**Wilson Mfg. Co.,** Wilson, N.C. $1,180,536. 5,600 general purpose tents. Defense Personnel Support Center, Philadelphia.

28—**Gulf Oil Corp.,** New York City. $4,145,400. 42,000,000 gallons of JP–4 jet fuel. Defense Fuel Supply Center, Alexandria, Va.

—**Coastal States Petrochemical Co.,** Houston, Tex. $1,217,395. 11,760,000 gallons of JP–4 jet fuel. Defense Fuel Supply Center, Alexandria, Va.

—**Souhan-Kent Mfg. Co.,** Clifton Heights, Pa. $1,363,500. 300,000 yards of wool cloth. Clifton Heights. Defense Personnel Support Center, Philadelphia.

ARMY

1—**Capital Radio Engineering Institute,** Washington, D.C. $1,500,000. Classified services. Silver Spring, Md. Army Electronics Command, Fort Monmouth, N.J.

—**Goodyear Tire & Rubber Co.,** Akron, Ohio. $5,630,243. Shoe assemblies for the M41 and M42 family of vehicles. Muncie, Ind. Army Tank Automotive Center, Warren, Mich.

—**Presto-lite Co.,** Toledo, Ohio. $3,725,221. Volt batteries for general vehicle application. Toledo. Army Tank Automotive Center, Warren, Mich.

—**Jordan Co. & Crown Construction Co.,** Columbus, Ga. $3,788,990. Expansion of OCS facilities at Fort Benning, Ga. Engineer Dist., Savannah, Ga.

—**Harvey Aluminum,** Torrance, Calif. $1,580,000. Detonating fuzes. Torrance. Frankford Arsenal, Philadelphia.

—**Farrell Construction Co.,** Memphis, Tenn. $1,031,608. Repair of hurricane damage in Hancock, Mississipi Project. Bay St. Louis, Miss. Engineer Dist., Mobile, Ala.

—**Logistics Management Institute,** Washington, D.C. $1,120,000. Fact finding analytical studies. Washington, D.C. Defense Supply Service.

5—**Hamilton Watch Co.,** Lancaster, Pa. $3,640,000. 106mm cartridge fuzes. Lancaster. Frankford Arsenal, Philadelphia.

—**General Time Corp.,** Westclox Div., LaSalle, Ill. $3,922,297. 105mm cartridge fuzes. LaSalle. Frankford Arsenal, Philadelphia.

—**Stewart & Stevenson Services,** Houston, Tex. $3,640,345. Generator sets. Houston. Army Mobility Equipment Center, St. Louis.

—**Chandler Evans, Inc.,** West Hartford, Conn. $1,509,905. Fuel control units for UH–1 helicopters. West Hartford. Army Aviation Materiel Command, St. Louis.

—**Eagle Picher Industries,** Joplin, Mo. $1,810,746. Wet batteries, primary type for Nike-Hercules. Joplin. Army Electronics Command, Philadelphia.

—**General Electric,** Lynchburg, Va. $1,572,935. Furnishing and installing a wide band transmission system for a radio communication system. Kennedy Space Center, Merritt Island, Fla. Canaveral Engineer Dist., Merritt Island, Fla.

—**Admiral Corp.,** Chicago. $3,960,927. Components of ARC–54 radio sets. Chicago. Army Electronics Command, Philadelphia.

—**Collins Radio Co.,** Dallas, Tex. $1,204,088. ARC–54 radio sets. Dallas. Army Electronics Command, Philadelphia.

6—**Herman H. West & Co.,** Murphy, N.C. $1,274,797. Clearance of 4,000 acres in connection with the Dworshak Dam and Reservoir Project. Near Lewiston, Idaho. Engineer Dist., Walla Walla, Wash.

7—**Freeto Construction Co.,** Pittsburgh, Kan. $1,404,461. Construction in connection with the Stockton Dam and Reservoir Project. Near Greenfield, Mo. Engineer Dist., Kansas City, Mo.

—**Garrett Corp., Air Cruisers Div.,** Belmar, N.J. $1,623,421. Inflatable shelters for the MUST (Medical Unit Self-Contained transportable). Belmar, N.J. and Buena Vista, Va. Research & Development Command, Office of the Surgeon General.

—**Technical Operations, Inc.,** Burlington, Mass. $1,050,000. Provision of automatic data processing system support in connection with the development and design of USCONARC. Fort Monroe, Va. Purchasing Office, Fort Monroe, Va.

—**Stolte & Santa Fe Engineers,** Oakland, Calif. $1,234,000. Electric power, flood lights, security alarm system, test stand buildings, alterations to existing buildings and AC engine fuel system. Beale AFB, Calif. Engineer Dist., Sacramento, Calif.

—**S. J. Groves & Son Co.,** Martinsburg, W. Va. $2,275,900. Construction of outlet works on East Lynn Reservoir, Twelve Pole Creek, W. Va. Engineer Dist., Huntington, W. Va.

8—**FMC Corp.,** San Jose, Calif. $2,662,275. Anti-personnel XM595 projectiles. San Jose. Picatinny Arsenal, Dover, N.J.

—**FMC Corp.,** San Jose, Calif. $3,523,526. 105mm anti-personnel projectiles. San Jose. Picatinny Arsenal, Dover, N.J.

—**Northrop Corp., Nortronics Div.,** Anaheim, Calif. $3,711,194. 106mm anti-personnel projectiles. Anaheim. Picatinny Arsenal, Dover, N.J.

—**Northrop Corp., Nortronics Div.,** Anaheim, Calif. $4,483,525. 105mm anti-personnel projectiles. Anaheim. Picatinny Arsenal, Dover, N.J.

—**Burgess Battery Co.,** Freeport, Ill. $1,283,360. Batteries used in the AN/PRC–6 radio. Freeport. Army Electronics Command, Philadelphia.

—**Baltimore Contractors, Inc.**, Baltimore, Md. $5,208,000. Construction of a communication security production building for the National Security Agency. Fort Meade, Md. Engineer Dist., Baltimore, Md.

14—**Massman Construction Co., Al Johnson Construction Co., and Peter Kiewit Sons' Co.**, Kansas City, Mo. $14,738,931. Work on Lock and Dam No. 14, Arkansas River, Arkansas and Oklahoma Project. Near Salisaw, Okla. Engineer Dist., Tulsa, Okla.

—**Maxson Construction Co.**, Dayton, Ohio. $1,346,670. Work on the Belleville Lock and Dam on the Ohio River. Parkersburg, W. Va. Engineer Dist., Huntington, W. Va.

—**Mason & Hanger, Silas Mason Co.**, New York City. $4,196,175. Projectiles. Burlington, Iowa. Ammunition Procurement & Supply Agency, Joliet, Ill.

15—**RCA**, Camden, N.J. $21,000,000. Classified electronic equipment. Camden. Army Electronics Command, Fort Monmouth, N.J.

—**Hughes Aircraft**, Culver City, Calif. $4,736,028. FY 1967 follow-on research and development for the TOW Missile System. Culver City (75%) and Tucson, Ariz. Army Missile Command, Huntsville, Ala.

—**Chrysler Motors**, Detroit. $2,110,695. Cargo pick-up trucks with 4-door cabs. Warren, Mich. Army Tank Automotive Center, Warren, Mich.

—**L. E. Mason Co.**, Hyde Park, Mass. $1,085,728. Fuzes. Hyde Park. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Trinity Construction Co. and Bauer Dredging Co.**, Houston, Tex. $2,887,260. Work on the Buffalo Bayou and Tributaries, Texas Project. Engineer Dist., Galveston, Tex.

—**Lawless and Alford, Inc.**, Austin, Tex. $1,617,910. Construction of masonry barracks buildings plus utilities at Fort Sill, Okla. Engineer Dist., Albuquerque, N.M.

—**Basic Construction Co.**, Newport News, Va. $2,693,600. Construction work at Fort Eustis, Va. Engineer Dist., Norfolk, Va.

18—**Holston Defense Corp.**, Kingsport, Tenn. $12,274,590. Various explosives. Kingsport. Ammunition Procurement & Supply Agency, Joliet, Ill.

19—**Blount Bros. Construction Co.**, Montgomery, Ala. $16,373,000. Work on the Miller's Lock and Dam Power House Project. Millers Ferry, Ala. Engineer Dist., Mobile, Ala.

20—**Manpower, Inc.**, Washington, D.C. $1,585,959. Kitchen police services for 24 mess halls serving enlisted students in the U.S. Army Engineer School, Fort Belvoir, Va. Army Engineer Center, Fort Belvoir, Va.

—**Dravo Corp., S. J. Groves & Sons, C. H. Leavell & Co, Fishback & Moore and D-K-C Constructors.** $131,216,855. Work on the Dworshak Dam and Reservoir, North Fork of the Clearwater River, Idaho Project. Near Lewiston, Idaho. Engineer Dist., Walla Walla, Wash.

—**N. R. Hamm Contractors**, Perry, Kan. $1,337,178. Work on the Shunganunga Creek Project. Topeka, Kan. Engineer Dist., Kansas City, Mo.

—**Boyd Construction Co.**, Grenada, Miss. $2,650,980. Work on Lock and Dam No. 17, Verdigris River Project. Wagoner, Okla. Engineer Dist., Tulsa, Okla.

—**General Electric**, Burlington, Vt. $1,510,000. Spare parts for XM–12 armament pods. Burlington. New York Procurement Detachment.

22—**Sperry Rand Corp.**, New York City. $39,966,685. Miscellaneous items of ammunition and manufacture of metal parts for 105mm and 155mm shells. Shreveport, La. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Vinnell Corp.**, Alhambra, Calif. $9,328,735. Operation and maintenance of T–2 tankers and land electrical distribution systems. Vietnam. Army Mobility Equipment Center, St. Louis.

—**Day & Zimmermann, Inc.**, Philadelphia. $22,627,983. Miscellaneous items of ammunition and components. Texarkana, Tex. Ammunition Procurement & Supply Agency, Joliet, Ill.

25—**Hendry Corp.**, Tampa, Fla. $3,729,700. New construction dredging of Palm Beach Harbor, Fla. Engineer Dist., Jacksonville, Fla.

26—**General Electric**, Pine Bluff, Ark. $1,487,083. Design, manufacture, delivery, installation and testing of generators with appurtenances for the Ozark Lock and Dam Project. Schenectady, N.Y. (manufacture); and Ozark, Ark. (delivery). Engineer Dist., Little Rock, Ark.

—**Atlas Corp., H. C. Smith Construction Co., and Global Associates**, Oakland, Calif. $10,000,000. Logistical support of the Kwajalein Test Site. NIKE X Project Office, Huntsville, Ala.

—**R&D Constructors**, Chicago. $1,176,000. Construction of an aircraft corrosion control facility and maintenance dock. McGuire AFB, N.J. Engineer Dist., New York City.

27—**Thomas Construction Co.**, Fresno, Calif. $1,666,119. Construction for the new Melones Reservoir Project. Stockton, Calif. Engineer Dist., Sacramento, Calif.

28—**Olin Mathieson Chemical Corp.**, New York City. $15,424,798. Loading, assembling and packing miscellaneous propellant charges and bag loading. Charlestown, Ind. Ammunition Procurement & Supply Agency, Joliet, Ill.

29—**Harvey Aluminum Sales, Inc.**, Torrance, Calif. $34,738,058. Loading, assembling and packing miscellaneous items of medium caliber ammunition and components. Milan, Tenn. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Olin Mathieson Chemical Corp.**, New Haven, Conn. $1,428,775. Rifle barrels. New Haven. Springfield Armory, Mass.

—**General Time Corp.**, LaSalle, Ill. $2,557,200. Rocket fuzes. Peru, Ill. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**American Machine & Foundry Co.**, Brooklyn, N.Y. $11,259,988. Metal parts for demolition bombs. Brooklyn. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**R. G. LeTourneau, Inc.**, Longview, Tex. $9,465,537. Metal parts for demolition bombs. Longview. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**A. O. Smith Corp.**, Chicago. $9,983,233. Metal parts for demolition bombs. Waco, Tex. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**TRW, Inc.**, Washington, D.C. $1,582,000. Implementation of an Integrated Management System in support of the Advanced Aerial Fire Support System. Washington, D.C. Harry Diamond Laboratories, Washington, D.C.

—**S. S. Mullen, Inc., and Dravo Corp.**, Seattle, Wash. $6,347,657. Construction of a multiproduct pipline from Whittier to Anchorage, Alaska. Engineer Dist., Anchorage, Alaska.

NAVY

1—**Columbus Milpar & Mfg. Co.**, Columbus, Ohio. $8,788,849. Bomb fins. Columbus. Navy Ships Parts Control Center, Mechanicsburg, Pa.

—**North American Aviation**, Columbus, Ohio. $3,340,766. Shipboard integrated operational intelligence center and photo interpretation complex. Columbus. Naval Air Systems Command.

—**North American Aviation**, Columbus, Ohio. $10,849,970. Conversion of A–5A weapons systems to an RA–5C configuration. Columbus. Naval Air Systems Command.

—**North American Aviation**, Columbus, Ohio. $4,100,000. OV–10A aircraft. Columbus. Naval Air Systems Command.

—**Sperry Rand Corp., Ford Instrument Co.**, Long Island City, N.Y. $2,645,000. Fire control computers for the Terrier and Tartar missile systems. Long Island City. Naval Ordnance Systems Command.

—**United Aircraft, Pratt & Whitney Aircraft Div.**, East Hartford, Conn. $10,421,136. TF30–P–3 engines and related equipment for the Air Force. East Hartford. Naval Air Systems Command.

—**United Aircraft, Pratt & Whitney Aircraft Div.**, East Hartford, Conn. $13,042,496. J52–P–8A engines for the Navy. East Hartford. Naval Air Systems Command.

—**Lockheed Aircraft Corp., Lockheed Missiles & Space Co.**, Sunnyvale, Calif. $8,265,169. Construction of a deep submergence rescue vehicle. Sunnyvale. Naval Ship Systems Command.

—**Standard Armament, Inc.**, Glendale, Calif. $1,255,320. Aircraft bomb ejector racks. Glendale. Navy Aviation Supply Office, Philadelphia.

5—**Clavier Corp.**, Richmond Hill, N.Y. $1,792,518. Radar equipment for installation aboard naval ships. Richmond Hill. Naval Ship Systems Command.

—**Boeing Co., Vertol Div.**, Morton, Pa. $54,323,312. CH–46A and UH–46A helicopters. Morton. Naval Air Systems Command.

—**Grumman Aircraft Engineering Corp.**, Bethpage, L.I., N.Y. $74,105,495. A–6A aircraft. Bethpage. Naval Air Systems Command.

—**United Aircraft, Sikorsky Aircraft Div.**, Stratford, Conn. $8,570,000. UH–34D helicopters. Stratford. Naval Air Systems Command.

—**Curtiss-Wright Corp., Wright-Aeronautical Div.**, Wood-Ridge, N.J. $1,090,000. Design, develop, fabricate, test and furnish a liquid metal regenerator system. Wood-Ridge. Naval Air Systems Command.

—**United Aircraft, Pratt & Whitney Aircraft Div.**, East Hartford, Conn. $17,118,276. J52–P–8A engines. East Hartford. Naval Air Systems Command.

—**Martin-Marietta**, Orlando, Fla. $11,256,190. WALLEYE guided weapons and related equipment. Orlando. Naval Air Systems Command.

—**Douglas Aircraft**, Long Beach, Calif. $44,321,550. A–4F and TA–4F aircraft. Long Beach. Naval Air Systems Command.

—**General Electric**, Johnson City, N.Y. $2,622,304. Automatic pilot control systems. Johnson City. Naval Air Systems Command.

—**Control Data Corp., Howard Research Div.**, Arlington, Va. $2,637,425. Engineering and support services for Fleet Ballistic Missile training installations. Special Projects Office.

6—**General Dynamics, Electric Boat Div.**, Groton, Conn. $53,842,793. Construction of two replenishment fleet oilers. Quincy, Mass. Navy Ship Systems Command.

—**Hughes Aircraft**, Culver City, Calif. $20,000,000. FY 1967 funding for the Phoenix missile system. Naval Air Systems Command.

—**United Aircraft, Pratt & Whitney Aircraft Div.**, East Hartford, Conn. $8,750,000. Continuation of design and development of the TF–30–P–8 engine. East Hartford. Naval Air Systems Command.

—**Teledyne Systems**, Hawthorne, Calif. $1,018,839. CH–46A prototype self-contained navigation and short range station-keeping systems. Hawthorne. Naval Air Systems Command.

—**Raytheon Co.**, Lexington, Mass. $4,094,973. Prototype development of a dual fire control system for Tartar ships. Lexington. Naval Ordnance Systems Command.

—**General Dynamics**, Pomona, Calif. $1,422,834. Test and evaluation of improvements to the basic design of the Standard Missile. Pomona. Naval Ordnance Systems Command.

—**Westinghouse Electric, Underseas Div.**, Baltimore, Md. $3,119,000. Long lead time items for the MK 48 torpedo. Baltimore. Naval Ordnance Systems Command.

—**Lockheed Missiles & Space Co.**, Sunnyvale, Calif. $4,500,000. Support of the Polaris program. Sunnyvale. Special Projects Office.

—**Lockheed Missiles & Space Co.**, Sunnyvale, Calif. $3,972,000. Repair of Polaris missile equipment. Sunnyvale. Special Projects Office.

—**VITRO Corp. of America**, Silver Spring, Md. $6,812,582. Polaris system engineering services. Silver Spring. Special Projects Office.

—**Lockheed Missiles & Space Co.**, Sunnyvale, Calif. $7,000,000. Tactical engineering services on the Polaris missile system. Sunnyvale. Special Projects Office.

7—**Grumman Aircraft Engineering Corp.**, Bethpage, L.I., N.Y. $9,195,590. C–2A aircraft. Bethpage. Naval Air Systems Command.

—**Raytheon Co.**, Lexington, Mass. $1,307,040. Long lead time materials and effort for production of Sparrow III guided missiles for the Air Force. Lowell, Mass. Naval Air Systems Command.

—**Yardney Electric Corp.**, New York City. $2,663,775. Mark 46, Mark 53 and Mark 67 torpedo batteries. Pawcatuck, Conn. Navy Purchasing Office, Washington, D.C.

—**Simplex Wire & Cable Co.**, Newington, N.H. $1,700,000. Array assemblies to be used in oceanographic research. Newington. Navy Purchasing Office, Washington, D.C.

—**Machinery Associates, Inc.**, Narbeth, Pa. $1,045,420. Machines to be used in shop moderization programs. Fond du Lac, Wis. Navy Purchasing Office, Washington, D.C.

11—**Sperry Gyroscope Co.**, Syosset, L.I., N.Y. $4,326,987. Repair of fleet ballistic missile submarine navigation sub-system components. Syosset. Naval Ship Systems Command.

—**Sperry Rand Corp., Univac Div.**, St. Paul, Minn. $2,719,123. Computers and related equipment and services for use on the Naval Tactical Data System aboard fleet ballistic missile submarines. St. Paul. Naval Ship Systems Command.

—**General Electric, Light Military Electronics Dept.**, Utica, N.Y. $4,639,594. Guidance and control groups for Chaparral missiles for the Army. Utica. Naval Air Systems Command.

—**Western Electric**, New York City. $3,363,673 and $2,243,512. Classified research and development in oceanographic services. Whippany, N.J. Navy Purchasing Office, Washington, D.C.

—**U.S. Steel**, Pittsburgh, Pa. $1,042,661. Bullpup guided missile warheads. Pittsburgh. Naval Air Systems Command.

—**Sanders Associates**, Nashua, N.H. $1.120,122. Research and development on classified electronics equipment. Nashua. Naval Air Systems Command.

—**Maxson Electronics Corp.**, Old Forge, Pa. $3,631,554. Bullpup missile parts. Old Forge. Naval Air Systems Command.

12—**Lenkurt Electric Co.**, San Carlos, Calif. $1,358,559. Micro-wave system for communications. San Carlos. Navy Purchasing Office, Washington, D.C.

—**Texas Instruments**, Dallas, Tex. $3,570,817. Shrike missile guidance and control sections and airframes. Dallas. Naval Air Systems Command.

—**Straightline Mfg. Co.**, Cornwell Heights, Pa. $1,792,745. Fin assemblies used with the Mark 81 Mod 1 bomb. Cornwell Heights. Navy Ships Parts Control Center, Mechanicsburg, Pa.

13—**Astro-Science Corp.**, South El Monte, Calif. $1,620,665. Airborne sound recorder-reproducer sets for ASW data recording. South El Monte. Naval Air Systems Command.

—**Sperry Rand Corp.**, Bristol, Tenn. $1,238,396. LAU34 missile launchers for use on A7A and F4 aircraft. Bristol. Navy Purchasing Office, Washington, D.C.

14—**Tacoma Boatbuilding Co.**, Tacoma, Wash. $14,717,815. Five motor gunboats. Tacoma. Naval Ship Systems Command.

—**Peterson Builders, Inc.**, Sturgeon Bay, Wis. $14,288,540. Five motor gunboats. Sturgeon Bay. Naval Ship Systems Command.

—**McDonnell Aircraft**, St. Louis. $96,400,000. FY 1966 procurement of F–4E, F–4J, F–4D and RF–4C aircraft. St. Louis. Naval Air Systems Command.

15—**National Steel & Shipbuilding Co.**, San Diego, Calif. $249,110,996. Construction of 17 tank landing ships. San Diego. Naval Ship Systems Command.

—**General Dynamics, Electric Boat Div.**, Groton, Conn. $111,487,795. Design and construction of four nuclear powered attack submarines. Groton. Naval Ship Systems Command.

—**Raytheon Co.**, Lexington, Mass. $4,599,994. Improved data converters, with associated ordnance alterations, spare parts and technical documentation for AN/SPG–51B radar sets. North Dighton, Mass. Naval Ordnance Systems Command.

—**North American Aviation, Autonetics Div.**, Anaheim, Calif. $2,678,246. Repair of Ships Inertial Navigation Systems gyroscopes and velocity meters. Anaheim. Naval Ship Systems Command.

—**Royal Industries, Engineered Products Div.**, Alhambra, Calif. $1,821,321. External auxiliary fuel tanks. Alhambra. Naval Air Systems Command.

—**Norfolk Shipbuilding & Drydock Corp.**, Norfolk, Va. $1,328,000. Regular overhaul of the oiler USS TRUCKEE (AO–147). Norfolk. Industrial Manager, 5th Naval District.

18—**Western Electric**, New York City. $5,776,185. Design, construction, testing and installation of a submarine towed acoustic array system. Whippany, N.J. Naval Ship Systems Command.

—**Texas Instruments, Inc., Apparatus Div.**, Dallas, Tex. $1,878,480. Spare parts for use on AN/APS–80 radar sets in P–3A aircraft. Dallas. Navy Aviation Supply Office, Philadelphia.

—**Thiokol Chemical Corp., Reaction Motors Div.**, Denville, N.J. $5,255,840. Prepackaged liquid propellant rocket engines for BULLPUP missiles. Rockaway, N.J. Naval Air Systems Command.

—**Corbetta Construction Co.**, Desplaines, Ill. $5,762,800. Construction of a barracks and mess hall at the Naval Training Center, Great Lakes, Ill. Midwest Div., Naval Facilities Engineering Command.

—**Willamette Iron & Steel Co.**, Richmond, Calif. $1,394,477. Overhaul and repair of the attack transport USS MAGOFFIN (APA–199). Richmond. Industrial Manager, 12th Naval District.

19—**General Precision, Inc., Librascope Group**, Glendale, Calif. $5,706,000. Mk 48 torpedo fire control system modification kits and related equipment. Glendale. Naval Ordnance Systems Command.

—**North American Aviation, Autonetics Div.**, Anaheim, Calif. $1,524,000. Evaluation and test program on ship inertial navigation system equipment. Anaheim. Naval Ship Systems Command.

—**Sperry Gyroscope Co.**, Long Island, N.Y. $1,306,562. Various components of the inertial navigation subsystems of fleet ballistic missile submarines. Long Island. Naval Ship Systems Command.

—**Todd Shipyards**, San Pedro, Calif. $1,338,492. Regular overhaul of the landing ship, dock USS MONTICELLO (LSD–35). San Pedro. Naval Ship Systems Command.

20—**Magnavox Co.**, Fort Wayne, Ind. $1,000,000. Modification kits and related equipment for airborne radar sets. Fort Wayne. Naval Air Systems Command.

—**National Geophysical Co.**, Dallas, Tex. $2,508,240. Components of Mark 55 Mod 7 mines. Dallas. Naval Ordnance Plant, Louisville, Ky.

22—**Curtiss-Wright Corp., Aeronautical Div.**, Wood-Ridge, N.J. $1,422,223. Kits for conversion of R3350–26 engines for use in A–1E/F/G/H aircraft. Wood-Ridge. Navy Aviation Supply Office, Philadelphia.

—**North American Aviation, Autonetics Div.**, Anaheim, Calif. $3,281,175. Repair of ships inertial navigation systems. Anaheim. Naval Ship Systems Command.

25—**Carrier Air Conditioning Co.**, New York City. $1,017,000. Air conditioning plants for submarines. Syracuse, N.Y. Naval Ship Systems Command.

—**General Electric**, Schenectady, N.Y. $19,147,440. Design and furnishing of Navy nuclear reactor compartment components. Schenectady. Naval Ship Systems Command.

—**Sperry Gyroscope Co.**, Syosset, L.I., N.Y. $1,486,707. Submarine inertial navigation equipment. Syosset. Naval Ship Systems Command.

26—**Nordic Construction Ltd.**, Honolulu, Hawaii. $1,074,500. Modifications to Commander-in-Chief, Pacific, Headquarters, Camp Smith, Hawaii. Naval Facilities Engineering Command.

27—**Ampex International Operations, Inc.**, Redwood City, Calif. $1,135,131. Ampex tape recorder reproducer systems plus components and test equipment. Redwood City. Navy Purchasing Office, Brooklyn, N.Y.

28—**Otis Elevator Co., Defense and Industrial Div.**, Brooklyn, N.Y. $2,421,351. Shipboard fire control system components. Brooklyn. Naval Ordnance Systems Command.

—**Ryan Aeronautical Co.**, San Diego, Calif. $1,172,000. Installment funding for FIREBEE drones. San Diego. Naval Air Systems Command.

29—**Boland Machine & Mfg., Inc.**, New Orleans, La. $1,723,321. Complete construction of a surveying ship. New Orleans. Naval Ship Systems Command.

—**General Dynamics**, New York City; **Litton Systems, Inc.**, Culver City, Calif.; and **Lockheed Shipbuilding and Construction Co.**, Seattle, Wash. (Each are receiving identical contracts for $5,275,000). Development of Fast Deployment Logistic Ship package proposals. Quincy, Mass., Culver City, Calif. and Arlington, Va. Naval Ship Systems Command.

AIR FORCE

1—**Boeing Co.**, Seattle, Wash. $46,200,000. Modernization of MINUTEMAN Wing I. Malmstrom AFB, Mont. Ballistic Systems Div. (AFSC), Norton AFB, Calif.

—**General Dynamics**, Fort Worth, Tex. $3,731,367. Production of modification kits and related equipment for the B–58 aircraft flight control system. Fort Worth. San Antonio Air Materiel Area (AFLC), Kelly AFB, Tex.

—**Serv-Air, Inc.**, Vance AFB, Okla. $7,445,518. Support services for FY 67. Vance AFB. San Antonio Air Materiel Area (AFLC), Kelly AFB, Tex.

—**Pan American World Airways**, New York City. $12,000,000. Management, operation and maintenance services for the Air Force Eastern Test Range, Patrick AFB, Fla. Air Force Eastern Test Range.

—**Hercules, Inc.**, Wilmington, Del. $3,000,000. Rocket motors and related data for the MINUTEMAN missile. Kenvil, N.J. Ogden Air Materiel Area (AFLC), Hill AFB, Utah.

—**Lear Siegler, Inc.**, Grand Rapids, Mich. $2,044,218. Production of aircraft bombing computers. Grand Rapids. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**Lockheed Aircraft**, Ontario, Calif. $7,000,000. Maintenance services during FY 67 for F–104 aircraft. Luke AFB, Ariz. Sacramento Air Materiel Area (AFLC), McClellan AFB, Calif.

5—**Hazeltine Corp.**, Little Neck, L.I., N.Y. $1,404,568. Work on the MARK XII reentry vehicle. Little Neck. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**Air Products & Chemicals, Inc.**, Allentown, Pa. $1,900,000. Relocation and modification of a liquid oxygen/nitrogen plant at Vandenberg AFB, Calif. Ballistic Systems Div. (AFSC), Norton AFB, Calif.

—**Wilcox Electric Co.**, Kansas City, Mo. $4,336,000. Production of communications equipment. Kansas City. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**National Lead Co.**, Toledo, Ohio. $1,883,050. Production of bombs. Toledo. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**Westinghouse Electric**, Baltimore, Md. $3,778,594. Modification of search and height finder radars. Baltimore. Oklahoma City Air Materiel Area (AFLC), Tinker AFB, Okla.

—**Ling Temco-Vought Electrosystems, Inc.**, Greenville, Tex. $4,840,629. Inspection and repair services for F–102 aircraft. Greenville, S.C. San Antonio Air Materiel Area (AFLC), Kelly AFB, Tex.

—**Honeywell, Inc.**, Hopkins, Minn. $1,796,163. Increasing production equipment for the production of aircraft ordnance. Hopkins. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**General Electric**, Cincinnati, Ohio. $1,796,840. Work on the advanced V/STOL program. Cincinnati. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**Collins Radio Co.**, Cedar Rapids, Iowa. $1,305,697. Production of spare parts for Very High Frequency Communications Systems. Cedar Rapids. Warner Robins Air Materiel Area (AFLC) Robins AFB, Ga.

—**Koehring Co.**, Springfield, Ohio. $1,324,092. Production of air cargo loading and unloading trucks. Springfield, Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

6—**Oshkosh Motor Truck, Inc.**, Oshkosh, Wis. $1,508,624. Overhaul of snow removal equipment. Oshkosh. Warner Robins Air Materiel Area (AFLC), Robins AFB, Ga.

—**VITRO Services**, Eglin AFB, Fla. $9,090,287. Management and operation of land ranges and the Eglin Gulf test range for FY 1967. Air Proving Ground Center, Eglin AFB, Fla.

—**Honeywell, Inc.**, Hopkins, Minn. $1,762,101. Engineering development of an antitank land mine. Hopkins. Air Proving Ground Center, Eglin AFB, Fla.

—**AVCO Corp.**, Richmond, Ind. $4,087,000. Production of aircraft ordnance fuzes, containers and related equipment. Richmond. Aeronautical Systems Div. (AFSC), Wright-Pattern AFB, Ohio.

—**Bendix Corp.**, Teterboro, N.J. $1,610,250. Production of electronic equipment for the C–141 aircraft. Teterboro. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**Consolidated Diesel Electric Corp.**, Stamford, Conn. $1,774,444. Production of

trucks for loading and unloading aircraft cargo. Stamford. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**General Dynamics**, Fort Worth, Tex. $3,618,420. Inspection and repair of B–58 aircraft. Fort Worth. San Antonio Air Materiel Area (AFLC), Kelly AFB, Tex.

—**General Motors**, Indianapolis, Ind. $4,559,215. Component improvement for the T–56 aircraft engine. Indianapolis. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**Hughes Aircraft**, Los Angeles. $1,861,097. Modification of Falcon aircraft missiles. Tucson, Ariz. Warner Robins Air Materiel Area (AFLC), Robins AFB, Ga.

—**I.B.M.**, Rockville, Md. $1,006,240. Maintenance and supply support for Air Force computers. Kingston, N.Y. Sacramento Air Materiel Area (AFLC), McClellan AFB, Calif.

—**Magnavox**, Fort Wayne, Ind. $1,152,000. Production of aircraft communications equipment. Fort Wayne. Warner Robins Air Materiel Area (AFSC), Robins AFB, Ga.

—**Sanders Associates**, Nashua, N.H. $1,476,293. Production of electronic equipment. Nashua. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**Texas Instrument, Inc.**, Dallas, Tex. $2,272,637. Production of spare parts for the radar system on RF–4C aircraft. Dallas. Warner Robins Air Materiel Area (AFLC), Robins AFB, Ga.

—**Batesville Mfg. Co.**, Batesville, Ark. $1,000,000. Production of bomb components. Batesville. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**Polarad Electronic Corp.**, Long Island City, N.Y. $1,128,828. Production of communications equipment. Long Island City. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**North American Aviation**, Canoga Park, Calif. $1,515,958. Production of 22 engines for THOR space boosters. Neosho, Mo. Space Systems Div. (AFSC), Los Angeles.

—**North American Aviation, Autonetics Div.**, Anaheim, Calif. $3,974,181. Components of the improved Minuteman guidance system. Anaheim. Ogden Air Materiel Area (AFLC), Hill AFB, Utah.

7—**Raytheon Co.**, Bedford, Mass. $1,184,433. Maintenance of the Rampart Radar Site, Holloman AFB, N.M. Missile Development Center, Holloman AFB, N.M.

—**General Dynamics**, Fort Worth, Tex. $1,639,861. Operation and maintenance of the Air Force Radar Target Scatter Site for FY 1967. Holloman AFB, N.M. Missile Development Center, Holloman AFB, N.M.

—**General Electric**, Syracuse, N.Y. $1,932,250. Modification of ground radar equipment. Syracuse. Air Proving Ground Center, Eglin AFB, Fla.

—**AVCO Corp.**, Stratford, Conn. $1,250,000. Work on the MARK 11A re-entry vehicle. Stratford. Ballistic Systems Div. (AFSC), Norton AFB, Calif.

—**Continental Electronics Mfg. Co.**, Dallas, Tex. $1,481,716. Operation and maintenance of radar sites at White Sands Missile Range, N.M. Missile Development Center, Holloman AFB, N.M.

8—**Aerojet General Corp.**, Downey, Calif. $6,250,000. Production of aircraft ordnance. Downey. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**Federal Electric Corp.**, Paramus, N.J. $22,135,797. Operation and maintenance of DEWLINE, North Atlantic Radio System, and the communication and electronic system at Thule, Greenland. Sacramento Air Materiel Area (AFLC), McClellan AFB, Calif.

—**Thiokol Chemical Corp.**, Bristol Pa. $45,018,011. Production of Stage I Minuteman missile motors. Brigham City, Utah. Ballistic Systems Div. (AFSC), Norton AFB, Calif.

—**United Aircraft**, Sunnyvale, Calif. $4,330,781. Production of napalm. Redwood City, Calif. Ogden Air Materiel Area (AFLC), Hill AFB, Utah.

—**Dow Chemical Co.**, Midland, Mich. $2,933,726. Production of napalm. Torrance, Calif. Ogden Air Materiel Area (AFLC), Hill AFB, Utah.

—**Sperry Rand Corp.**, Washington, D.C. $1,041,720. UNIVAC 1050 computer systems. Utica, N.Y. Wright-Patterson AFB, Ohio.

11—**IT&T**, Nutley, N.J. $8,884,097. Automatic digital stores and related equipment. Paramus, N.J. Electronics Systems Div. (AFSC), L. G. Hanscom Field, Mass.

—**I.B.M.**, Washington, D.C. $1,379,000. Rental of electronic data processing equipment. Western Test Range, Vandenberg AFB, Calif.

—**RCA**, Moorestown, N.J. $1,360,000. Engineering analysis and technical services in support of the Ballistic Missile Early Warning System. $3,572,000. Maintenance of instrumentation radars. Eastern Test Range, Patrick AFB, Fla.

—**General Electric**, West Lynn, Mass. $7,313,532. Production of aircraft engines for T–38 and F–5 aircraft. West Lynn. $1,000,000. Production of aerospace ground equipment. Utica, N.Y. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**Goodyear Aerospace Corp.**, Akron, Ohio. $4,490,000. Production of an air transportable photographic laboratory. Akron. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**Aerospace Corp.**, El Segundo, Calif. $21,791,500. Scientific, engineering and technical services in support of space and ballistic programs. El Segundo. Space Systems Div. (AFSC), Los Angeles.

—**Motorola, Inc.**, Chicago. $1,261,800. Production of ground ultra-high frequency radio equipment. Chicago. Electronic Systems Div. (AFSC), L. G. Hanscom Field, Mass.

12—**General Electric**, Syracuse, N.Y. $9,290,000. Operation and maintenance of the space tract sensor facilities at Shemya Air Force Station, Alaska. Sacramento Air Material Area (AFLC), McClellan AFB, Calif.

—**RCA**, Moorestown, N.J. $2,700,000. Operation and maintenance of the Moorestown Radar Tracker Sensor Facility. Sacramento Air Materiel Area (AFLC), McClellan, AFB, Calif.

—**Boeing Co.**, Wichita, Kan. $9,757,655. Modification of B–52 aircraft. Wichita. Oklahoma City Air Materiel Area (AFLC), Tinker AFB, Okla.

—**IT&T**, Nutley, N.J. $1,023,000. Production of air navigation equipment for the F–111 aircraft. Nutley. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

13—**Metric Systems Corp.**, Fort Walton Beach, Fla. $1,563,115. Production of aluminum platforms. Fort Walton Beach. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

15—**RCA**, Camden, N.J. $11,033,011. Operation, maintenance and logistic support of the White Alice Communications System for FY 1967. Sacramento Air Materiel Area (AFLC), McClellan AFB, Calif.

—**IT&T**, Paramus, N.J. $1,245,000. Management, operation, and maintenance of the common use facility of Air Force Plant 42 at Palmdale, Calif. Edwards AFB, Calif.

—**Sanders Associates**, Bedford, Mass. $1,531,200. Development of aircraft fuzes. Bedford. Air Proving Ground Center, Eglin AFB, Fla.

—**Applied Technology, Inc.**, Palo Alto, Calif. $2,028,750. Electronic systems for F–100 and F–4 aircraft. Palo Alto. Warner-Robins Air Materiel Area (AFLC), Robins AFB, Ga.

18—**Libby Welding Co.**, Kansas City, Mo. $1,471,124. Production of 193 generator sets (75KVA). Kansas City. Sacramento Air Materiel Area (AFLC), McClellan AFB, Calif.

19—**Allis Chalmers Mfg. Co.**, Milwaukee, Wis. $6,361,344. Production and testing of electrical equipment and standby generators for Minuteman Missile Wing IV, Milwaukee. Corps of Engineers, Ballistic Missile Construction Office, Norton AFB, Calif.

20—**General Dynamics**, San Diego, Calif. $3,110,000. Value engineering incentive provisions for production of modification kits for external fuel tanks for F–106 aircraft. San Diego. San Antonio Air Materiel Area (AFLC) Kelly AFB, Tex.

21—**North American Aviation, Autonetics Div.**, Anaheim, Calif. $3,470,338. Overhaul and repair of Hound Dog air-to-air missiles. Anaheim. Oklahoma City Air Materiel Area (AFLC), Tinker AFB, Okla.

22—**Cleveland Pneumatic Tool Co.**, Cleveland, Ohio. $3,353,925. Production of landing gear components for KC–135 aircraft. Cleveland. Ogden Air Materiel Area, (AFLC), Hill AFB, Utah.

—**IBM**, Cape Canaveral, Fla. $1,631,568. Rental of automatic data processing equipment. Patrick AFB, Fla. Air Force Eastern Test Range, Patrick AFB, Fla.

—**Ling-Temco-Vought Electrosystems**, Greenville, Tex. $2,000,000. Production of airborne command and control systems. Greenville. Aeronautical Systems Div., (AFSC), Wright-Patterson AFB, Ohio.

—**Bendix Corp.**, Baltimore, Md. $1,687,985. Production of transportable communication relay centers. Towson, Md. Oklahoma City Air Materiel Area, (AFLC), Tinker AFB, Okla.

26—**General Electric**, West Lynn, Mass. $4,816,300. Production of T–58 engines for UH–1 and CH–3 helicopters. West Lynn. Aeronautical Systems Div., (AFSC), Wright-Patterson AFB, Ohio.

—**Electronic Communications, Inc.**, St. Petersburg, Fla. $1,017,824. Production of communication and electronic equipment for KC–135 aircraft. St. Petersburg. Oklahoma City Air Materiel Area, (AFLC), Tinker AFB, Okla.

—**Boeing Co.**, Seattle, Wash. $3,700,000. Continuing development study and testing programs for the Minuteman Missile System. Seattle. Air Force Systems Command, Wright-Patterson AFB, Ohio.

—**Cleveland Pneumatic Tool Co.**, Cleveland, Ohio. $1,874,999. Production of B–52 landing gear components. Cleveland. Ogden Air Materiel Area, (AFLC), Hill, AFB, Utah.

27—**Lockheed Aircraft Service Co.**, Jamaica, N.Y. $1,795,122. Annual maintenance services for Special Air Mission aircraft for FY 1967. Oklahoma City Air Materiel Area, (AFLC), Tinker AFB, Okla.

—**Aerodex, Inc.**, Miami, Fla. $8,451,095. Overhaul of R–4360 reciprocating aircraft engines. Miami. San Antonio Air Materiel Area, (AFLC), Kelly AFB, Tex.

—**Dallas Airmotive, Inc.**, Dallas, Tex. $2,330,133. Overhaul of R–2800 reciprocating aircraft engines. Dallas. San Antonio Air Materiel Area, (AFLC), Kelly AFB, Tex.

28—**Aerodex, Inc.**, Miami, Fla. $1,800,150. Overhaul of R–3350 reciprocating aircraft engines. Miami. Directorate of Procurement and Production, Kelly AFB, Tex.

—**Ling-Temco-Vought, Inc.**, Greenville, Tex. $1,805,500. Modification of C–133 aircraft. Greenville. Warner Robins Air Materiel Area, (AFLC), Robins AFB, Ga.

—**General Precision, Inc.**, Little Falls, N.J. $3,000,000. Production of components for airborne navigational computers. Little Falls. Aeronautical Systems Div., (AFSC), Wright-Patterson AFB, Ohio.

—**General Motors**, Indianapolis, Ind. $1,598,000. Production of T–56 aircraft engine power sections. Indianapolis. Aeronautical Systems Div., (AFSC), Wright-Patterson AFB, Ohio.

—**Goodyear Aerospace Corp.**, Akron, Ohio. $1,156,000. Production of aerospace ground equipment to support airborne radar. Akron. Aeronautical Systems Div., (AFSC), Wright-Patterson AFB, Ohio.

29—**Royal Industries, Inc., Engineered Products Div.**, Alhambra, Calif. $3,827,132. Production of external fuel tanks for F–100 aircraft. Alhambra. Sacramento Air Materiel Area, (AFLC), McClellan AFB, Calif.

—**Boeing Co.**, Seattle, Wash. $1,392,500. Engineering services in support of the Minuteman Missile System. Seattle. Ogden Air Materiel Area, (AFLC), Hill AFB, Utah.

—**Honeywell, Inc.**, Arlington, Va. $2,380,639. Purchase of leased computer systems. Arlington. 2750th Air Base Wing, Wright-Patterson AFB, Ohio.

—**North American Aviation, Autonetics Div.**, Anaheim, Calif. $1,004,500. Engineering services in support of the Minuteman Missile guidance system. Anaheim. Ogden Air Materiel Area, (AFLC), Hill AFB, Utah.

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New Combat Communications Units To Streamline Forward Air Control

The Air Force's latest development in the field of forward air control was unveiled during roll-out ceremonies of a new jeep-mounted combat communications unit at General Dynamics' Electronics Division, Rochester, N. Y. The communications unit is a part of the 407L Tactical Air Control System managed by the Air Force Systems Command's Electronic Systems Division (ESD).

Developed for use by forward air controllers, the highly mobile units will help to streamline request channels for strike aircraft during close air support missions. Each jeep is equipped with four transceivers and associated antennas mounted on a base which can be removed and mounted on an armored personnel carrier or light truck.

Space is also provided in the jeep for two portable, battery-operated, manpack radio sets; one to communicate with ground troops and the other to direct aircraft. The jeep-mounted communications equipment includes four different type radios to enable forward air controllers to talk both to strike aircraft and to other ground troops. All equipment is located directly behind the vehicle seats.

The complete system with vehicle can be delivered by parachute, or the equipment and base can be quickly detached from the jeep and dropped separately. Powered by the vehicle's generator, the unit can also be operated in a semi-fixed mode from an auxiliary power generator mounted on an accompanying trailer.

In addition to furnishing equipment for direct air support, the 407L system is developing equipment groups for aircraft control and warning, air traffic control and command communications. Mobility, modularity and flexibility provide a capability for the system to operate in various locations depending on the required military mission.

Colonel George A. Guy, ESD system program director, explains the 407L as a two-step developmental program. The first step involves the acquisition of equipment presently within the state of the art to provide present tactical forces with an early increase in quantitative capability. Step two involves the development of improved systems utilizing new equipments such as lightweight radars, computer aided tracking and intercept procedures, and the use of improved materials, components and communication techniques.

DCAA Opens Contract Audit Institute at Memphis

The Defense Contract Audit Agency (DCAA) has established a Contract Audit Institute in Memphis, Tenn., using facilities of the Defense Depot, Memphis, a field activity of the Defense Supply Agency.

The new educational facility opened June 6 with a three-week course presenting technical orientation in the contract audit function to 60 newly employed graduates of college and university accounting schools. Courses of various types related to contract audit will be conducted on a continuing basis for the more than 3,000 professional auditors of the agency. Instructors will be senior field auditors of DCAA.

The objective of the school is to advance the technical and administrative proficiency of contract auditors through courses developed from on-the-site situations and case studies, and to provide a training medium to adapt new auditing concepts to DCAA audit assignments.

DCAA is now responsible for audit of contracts performed by more than 4,000 business enterprises, universities and other institutions. It is the only agency with which defense contractors deal concerning contract audit matters.